AN HBJ PUBLICATION

APRIL 1985/$2.00

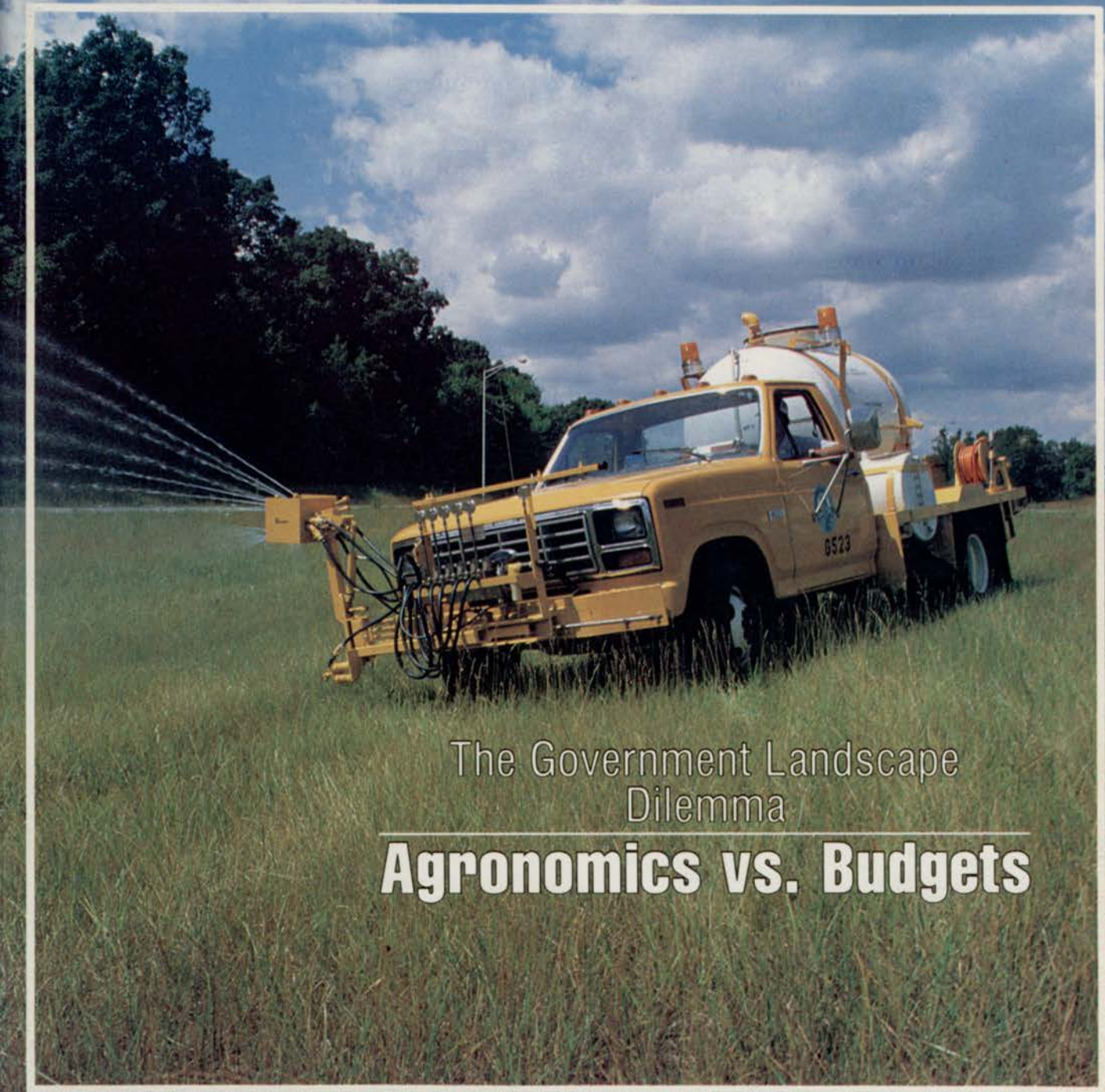
WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

Turf Disease Control Guide

The Hidden Enemy: Protecting Plants from Borers

Central Park—Manhattan's Green Jewel



The Government Landscape Dilemma

Agronomics vs. Budgets

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APRIL 1985 VOLUME 24, NUMBER 4

WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

28 The Agronomic vs. Budget Dilemma

Government landscape managers are feeling the squeeze of increasing problems vying for their time. Doing more with less tops the list.

30 Central Park—One of a Kind

A slice of the Adirondacks sits in the middle of Manhattan under the watchful and caring eye of Director of Horticulture Frank Serpe.

36 An Unrelenting Challenge

Hickam Air Force Base on Oahu, Hawaii, is blessed and cursed with almost perfect weather. The ideal growing conditions pose some special problems for entomologist Jonathan Kajiwara.

42 The Chemical Connection

The Indiana State Highway Department is proving chemicals can be a cost and time-saving alternative to mowing.

48 Borers: The Hidden Enemy

This often overlooked menace can do most of its damage before it's even detected. Some helpful suggestions on how to detect borers before it's too late.

62 TURF DISEASE CONTROL GUIDE

The third in WT&T's series of five landscape managers' guides. Tips on controlling disease in both warm and cool season turfgrasses. An excellent reference to save.

82 "Lavascaping" the Kona Surf

Coaxing a beautiful landscape from Hawaii's black lava rock is no problem for Ray Berg. The veteran landscaper finds the project a satisfying challenge.

DEPARTMENTS

4 Trends
8 Green Industry News
16 Government Update
20 In-the-Middle
24 Landscape Log
26 Jobtalk
85 Sports Turf
86 New Products
96 Problem Solver
98 Events
100 Classifieds
102 Letters
104 Outlook

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HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION

by **Bruce F. Shank**, executive editor

NY extension asks for $1 million

The future of extension funding may have become evident during the Nassau/Suffolk Landscape Gardeners Conference in Hauppage, Long Island, in late February.

Dr. George Good, head of New York Extension, asked a gathering of turf leaders the morning after the show to donate $1 million to turf programs. Good, saying the turf industry was a $100 million business on Long Island alone, should be able to generate 1 percent of that for research and extension. The pitch for funding was bold and the amount shocked a number of people present, including Charles Pendlebury, Lebanon Chemical's marketing consultant on Long Island.

Despite the apparent boldness displayed by Good, isn't it much better to solicit funds this way rather than pressure teaching and research staff to solicit their own funding? If the method works, other states will apply it quickly. Any way you look at the situation, state organizations will be asked to do more than put on a show in the future; they will be asked to pay for a large portion of turf research as well.

Sports turf egg begins to hatch

The Sports Turf Managers Association is finding exceptionally strong support from manufacturers for its membership promotion. There is a definite consensus among manufacturers that the sports turf market is virtually untapped and represents an opportunity as promising as lawn care did 10 years ago.

The fledgling organization has doubled its membership in less than four months. Operated completely by volunteers at this time, STMA has produced its first six-page newsletter and will release a membership roster and specifications guide in late March.

Early research has shown the number of fields with respectable budgets for maintenance to exceed 20,000. Further research will help pinpoint these fields.

During the Golf Course Superintendents show, another organization designed to promote better fields to Parent Teachers Associations indicated a desire to work with STMA to accelerate market development.

The market badly needs nationally recognized field construction and maintenance standards. No such set of standards currently exists in the U.S. Library of Congress. STMA is supporting a book currently being written by Dr. Kent Kurtz of Cal Poly Pomona and Dr. William Daniel of Purdue University on sports field construction and maintenance. Cal Poly has granted Kurtz a sabbatical to work on the project and Daniel is devoting his efforts full time to the sports turf market when he retires this month.

If you are interested in joining the sports turf movement, contact Kent Kurtz, 1458 N. Euclid, Ontario, CA 91764, or Bruce Shank, Weeds Trees & Turf magazine, 7500 Old Oak Blvd., Cleveland, OH 44130.

The sports turf egg is about to hatch.

WT&T

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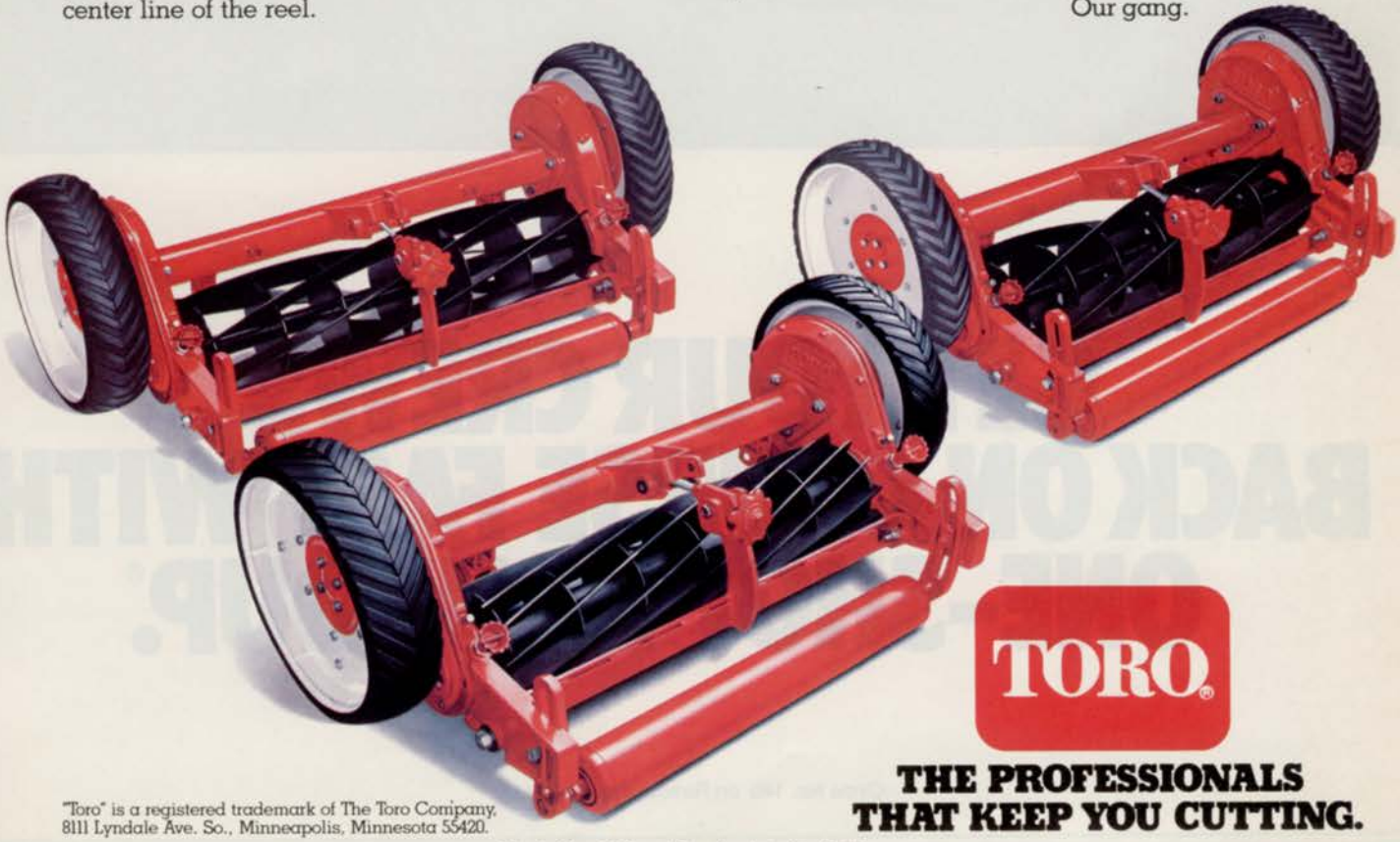

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With Roundup® herbicide, your crews will spend less time controlling weeds and more time keeping greens, fairways and other high-visibility areas up to par.

One-shot, versatile Roundup controls over 100 species of weeds, roots and all, so they won't grow back. That includes nuisance weeds like poison ivy, poison oak and kudzu. With one gallon of 2% spray solution, one man can treat 1,000 feet of fenceline for less than $2.00.* Or the areas around 30 trees for about a nickel apiece. You can get as much weed control with one treatment of Roundup as you would with up to 6 string trimmings over the course of a season.

Let the versatility of Roundup free your crews from time-consuming mechanical or hand weeding jobs.

AROUND THE COURSE	AROUND THE CLUBHOUSE	HIGH-VISIBILITY AREAS
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With Roundup along the edges of the rough areas, you'll improve the looks of your course, plus improve and maintain "speed of play." Players will spend less time hunting for balls lost in dense undergrowth.

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Monsanto

GCSAA breaks attendance records in D.C.

The numbers tell the story for the Golf Course Superintendents Association of America's 56th International Golf Course Conference and Show in February in Washington D.C.

"I guess you could describe it as a smashing success. Or, how about a resounding success?" GCSAA publicist Clay Lloyd says.

Either way it was big. Real big.

Preliminary results show about 9,000 registrants (almost 1,000 more than the '84 conference in Las Vegas) and a significant jump in the number of exhibitors, again over the previous high set the year before in Las Vegas. Included in the 290 exhibitors in the most recent GCSAA trade show were 66 first timers.

One of those first-time exhibitors, Guy Atkisson of Dietrich's Tree Well, said traffic was steady and good even though his booth was located in an annex next to the main hall.

"The quality of the traffic through here was what impressed me," he said.

Bob Knocke of Griswold Controls, also in the annex, had a major problem—his equipment didn't arrive, but he still said traffic and interest was good.

Throngs await *to tour the trade show floor.*

Bob Speaker, western regional manager for Yamaha, had a front row seat as far as booth space. Located right at the main door, he said booth traffic was much better in D.C. than in Las Vegas last year.

"We had a lot of interest in our new electric golf car," he said.

Charles Putnam of Weathermatic,

continued on page 12

INDUSTRY

NOR-AM buys Upjohn's plant health business

NOR-AM Chemical Company, marketers of Ureaform Powder Blue, Turcam, and Ficam, recently purchased the plant health business of The Upjohn Company, Kalamazoo, MI.

The major products included in the purchase are the Acti-dione line of fungicides for turfgrass, lawns, and ornamentals; Banol turf fungicide; Proxol insecticide; Enide preemergence herbicide; Botran fungicide; Collego postemergent herbicide; SOK-BT biological insecticide; and Botec peanut seed protectant.

A joint announcement by Leo Ekins, president of NOR-AM, Wilmington, DE, and David Phillipson, vice president of the Agricultural Division of The Upjohn Company, Kalamazoo, MI, indicates the former Upjohn products will be marketed and distributed "in accordance with NOR-AM sales and marketing policies."

NOR-AM, a subsidiary of Schering AG, a company headquartered in West Germany, manufactures and sells a wide variety of agrochemical, specialty chemical, industrial chemical, and animal health products.

The purchase price of the transaction was not disclosed by either NOR-AM or Upjohn.

INDUSTRY

GCSAA show brings luck to three

Some superintendents went home from the Golf Course Superintendents Association of America show a little richer after winning WEEDS TREES & TURF annual sweepstakes drawing held at the show in February.

George W. Cavanaugh of Bear Lanes Country Club in West Palm Beach, FL, pocketed $1,000 after he submitted his name at the Rainbird booth. Joe Leopold of Tualatin Development, Portland, OR, won the $500 second prize with an entry submitted at the Barebo booth and Harry Nichol of Burning Tree Country Club, Greenwich, CT, took home $250. His entry was submitted at the Irri-trol booth.

Our congratulations to all the winners and participating exhibitors at the GCSAA show.

INDUSTRY

Sale of Stauffer Chemical in works

Chesebrough-Pond, Inc., in an all-cash transaction that could amount to $1.25 billion, is seeking to acquire Stauffer Chemical Company. Boards of both companies recently approved a plan for Chesebrough to purchase Stauffer common stock at $28 per share.

Stauffer, headquartered in Westport, CT, makes and markets chemicals and chemical-related products including such Green Industry products as Betasan, a preemergance herbicide, Imidan, an insecticide for trees, Aspon, an insecticide for turf, and the nematocide Vapam.

"First of all, this is just a proposal at

continued on page 12

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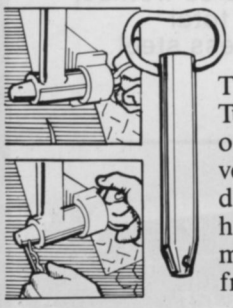
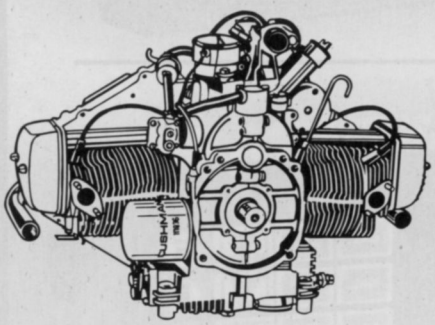
Aerating, hauling, dumping, spraying, seeding, spreading and top dressing — one vehicle does the work of a fleet of machines.



The Cushman Turf-Care System offers you a single vehicle that can do the work of a half dozen machines—at a fraction of the cost.

The exclusive Cushman pin disconnect system lets you attach and remove accessories in minutes.

A NEW 22-HP ENGINE.



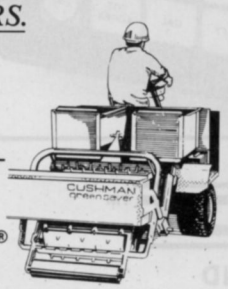
The Cushman Turf-Truckster™ is now equipped with a new 22-hp gas engine.

It gives you the power to haul a full load uphill, without straining. It maintains a sure, steady speed while you're spraying or spreading.

And it's built tough. The crankshaft is forged alloy steel. The cylinder heads are reinforced for extra strength under stress. And the hydraulic pump is mounted to the engine for better service life and smooth operation.

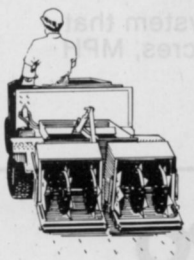
Team up the new 22-hp Turf-Truckster with any of the following accessories for a complete Turf-Care System.

THE AERATORS.



Because you have two types of turf to aerate, Cushman makes two aerator attachments for your Turf-Truckster.

The Greensaver® is ideal for greens and other delicate areas . . . while the Quick Aerator makes short work of big jobs (it covers a 46″ swath).



Both can be equipped with interchangeable coring or deep-slicing tines.

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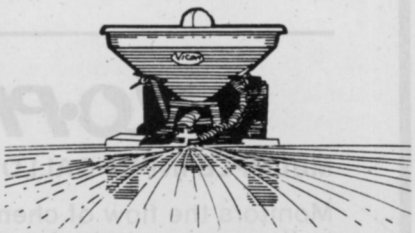
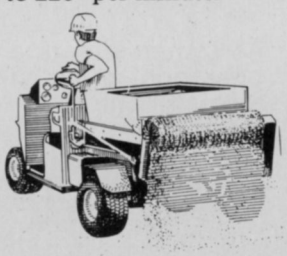


THE TOP DRESSER.

Everything from rock salt to powdered fertilizer can be uniformly spread across a 31½″ swath at a rate of up to 220′ per minute.



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TURFGRASS

Drainage key to good sports turf

Preparing turf for major league sporting events "is working in a high speed lane where maintenance is measured in hours," says David N. Fleming, who's experienced on both the golf course and on the ball field.

Fleming, veteran superintendent at Singing Hills Country Club, El Cajon, CA, serves as consultant to Jack Murphy Stadium in San Diego. He spoke recently at the GCSAA Conference in Washington D.C.

Drainage is the key to good sports turf, Fleming says, pointing to his own experience at Jack Murphy. A flood in 1980 deposited a layer of silt on the stadium turf, harming the field's drainage. To restore proper drainage Fleming says crews removed the contaminated soil, tilled to a depth of 30 inches, then resurfaced the field with a sand base before resodding with mature hybrid Bermudagrass.

One key to the success of the project was the washing of all silt from the roots of the sod, Fleming points out.

Pregerminated ryegrass seed worked into divots immediately after a sporting event, and the use of heavy geotextile materials to protect turf during concerts and motorsport events also help him to restore the Jack Murphy field to playing condition quicker.

"I brought a little of the golf course industry to the stadium," Fleming says.

STAUFFER *from page 8*

this point," Chesebrough spokesman Ronald S. Ziemba tells WTT. "We have no plans to make any major changes to Stauffers. The products they now have will be subject to the same scrutiny that they now are. The Chesebrough ownership will not make a difference in this respect."

At presstime, the offer was reportedly conditioned on Chesebrough's ability to purchase a minimum of 50 percent of outstanding Stauffer shares.

Ralph E. Ward, chairman of Chesebrough says his company is buying Stauffer "to give us some new products" through its research capability.

Stauffer ended fiscal 1984 (Sept. 84) with sales of $1.5 billion. Chesebrough-Pond's Inc., Greenwich, CT, makes such divergent brand name products as Vaseline, Ragu spaghetti sauces, Health-tex children's apparel, and Bass shoes. It had estimated sales of $1.8 billion during 1984.

Although some analysts speculate Chesebrough is making the effort to acquire Stauffer to protect itself against a possible takeover, Ward maintains new products are at the root of the purchase.

Says Ward, "Stauffer's substantial research capability will be well complimented by Chesebrough's marketing expertise."

Ward claims Stauffer Chemical will remain intact following its purchase, and no layoffs at either company are planned. Chesebrough reportedly employs about 22,000, Stauffer Chemical 11,600.

GOLF

Dealing with unions? Know the rules

"Don't try to fight it," Gary L. Myers says of golf superintendents faced with a union situation at their courses.

Myers, superintendent at the Desert Inn Country Club, Las Vegas, told attendees at the recent GCSAA Conference they will have better success at union courses by knowing the rules and keeping the lines of communication open.

continued on page 16

GSCAA SHOW *from page 8*

Dallas, said he got a number of good leads from this year's show.

"Monday (the traffic) was unbelievable," he said. "Golf has been at a peak the last three years and probably next year, too. The economy is better and renovation is being done. Budgets can support improving irrigation systems."

Learning what's *new—a major part of the GCSAA show.*

And, the people who viewed the record-breaking number of exhibits had no complaints, either.

John Hamilton of the Nicklaus Sports Center in Cincinatti attends the conference every year.

"I always find something new here, especially in chemicals. It's a really good chance to talk to reps and dealers."

GCSAA's Lloyd said several factors were probably involved in the large numbers.

"Certainly the location of Washington D.C. in a great population center had something to do with it. There are also a lot of golf courses in that area."

Impressive as the attendance figures were, organizers of the conference put together an outstanding package of educational and instructional sessions. More than 110 of the nation's top golf course superintendents pooled their expertise to present 330 hours of instruction. Perhaps the most popular sessions—as measured by the audiences they drew—were sessions dealing with golf course design and the use of computers in golf course maintenance and management.

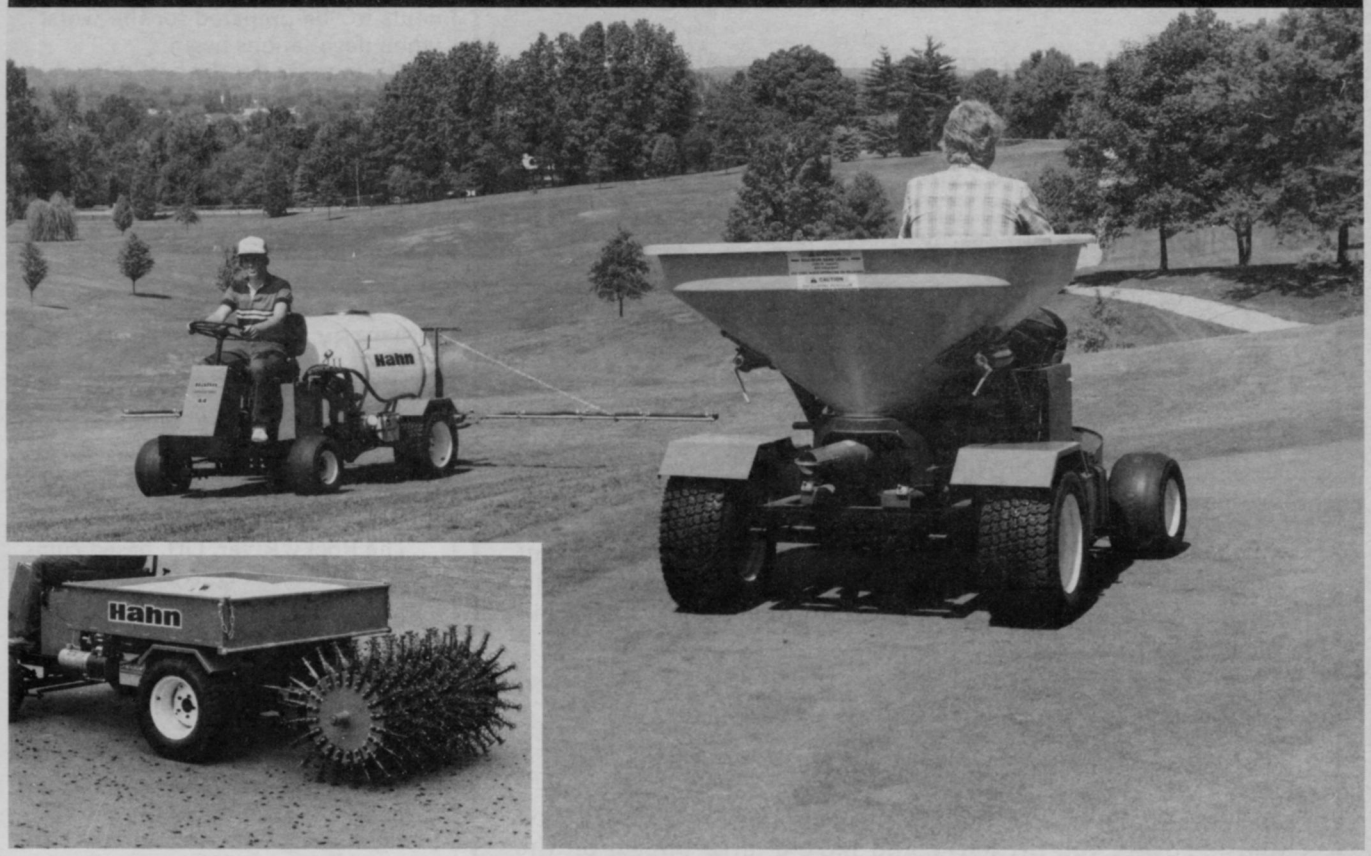
The attendance the D.C. area drew underscored the GCSAA's announcement of a mid-year conference in September in Indianapolis, IN.

"We'll be going after different demographics with a smaller show," GCSAA Executive Director John Schilling said. "We also want a show where supervisors as well as crews and maintenance workers can come and take advantage of everything we had at the international show."

The size of the conference also obviously impressed several notable guests. CBS sports commentator Pat Summerall, in his keynote address during the opening session, lauded the GCSAA. "It's this kind of support that makes your association the strong group that it is today," he told a capacity crowd.

And former President Gerald Ford, this year's winner of the Old Tom Morris Award, was visibly taken back by the 1,400 attendees at the closing banquet at the Sheraton Washington. Ford, showing a warmth and wit which surprised many of those in attendance, said he was impressed by the "magnitude and unity" of the GCSAA.

HAHN MULTI-PRO 44, IT WORKS. AND WORKS... AND WORKS...



Greens or fairways . . . the Multi-Pro 44 with its big high flotation tire to protect your turf, converts in minutes to a Sprayer, Spreader, Aerifier or Utility Bed. Designed for easy on, easy off switching and year 'round service.

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GOVERNMENT UPDATE

States crack down on certification

Say goodbye to the written test exemptions for private applicators, open book tests, and high pass rates on certification exams, warned state pesticide officials in Maryland, Virginia, and the District of Columbia, during the recent Interstate Ornamental Plant Management Conference held at the University of Maryland.

These states have also recently passed laws allowing fines to be levied against pesticide law violators in compliance meetings, instead of drawn-out court actions. The punishment now closely follows the crime.

Mark Greenleaf, head of the pesticide branch of the District of Columbia Department of Consumer and Regulatory Affairs, told the audience the certification examination is being expanded from 32 questions to 50, no books will be allowed in the test room, and failure rates have risen from seven percent to more than 30 percent. Furthermore, pending legislation could require private applicators to take the written examination like everyone else.

Greenleaf also said his department now conducts unannounced inspections of jobs. Although the District of Columbia recognizes certification from Virginia and Maryland, it requires licensing in the District before work can proceed.

An exemption from licensing for corporate pesticide applicators may also be changed. This could force private golf course superintendents and nursery owners to either get licensed or hire outside contractors to apply pesticides, said Greenleaf.

Options for waste disposal

Changes made last November in the Resource Conservation and Recovery Act (RCRA) could have a large impact on the Green Industry concerning pesticide wastes disposal.

The National Workshop on Pesticide Wastes Disposal in January in Denver emphasized various disposal options including physical, biological, chemical, land application and incineration treatment of wastes under RCRA and FIFRA laws.

The EPA estimated there were 55,000 "hazardous waste generators" in 1984, but estimates that number will climb to 175,000 in 1985.

The RCRA amendments have been called the "most significant rewrite of any environmental statute." The new authority and directives in the amendments impose significant restrictions and prohibitions on future land disposal of hazardous wastes, close many regulatory loopholes and subject a broad range of wastes and waste generators to regulation for the first time. Any organization that produces 100 kg (220 pounds) of listed waste material per month is covered by the new law.

Senator John H. Chafee (R-RI), the chief Senate architect for the major RCRA changes will be the featured speaker at a luncheon April 18th in Washington D.C.

UNIONS *from page 12*

"You need to know the contract inside and out," Myers reports. "If I know the rules better than the employees, that gives me the edge." Myers also recommended keeping a close working relationship with the shop stewart, eliminating the need to deal with a business agent.

Myers claims the two-week strike at his unionized Desert Inn course two years ago "was the worst two weeks of my life," and he advises superintendents to "be prepared for the worst" when negotiations begin.

"Unions are not the best thing that you can have happen to your golf course, but in some situations they're not that bad."

Says Meyers, "If your club can give your employees good salaries and good benefits, then you're better off without a union."

INDUSTRY

Lesco trucks on call coast to coast

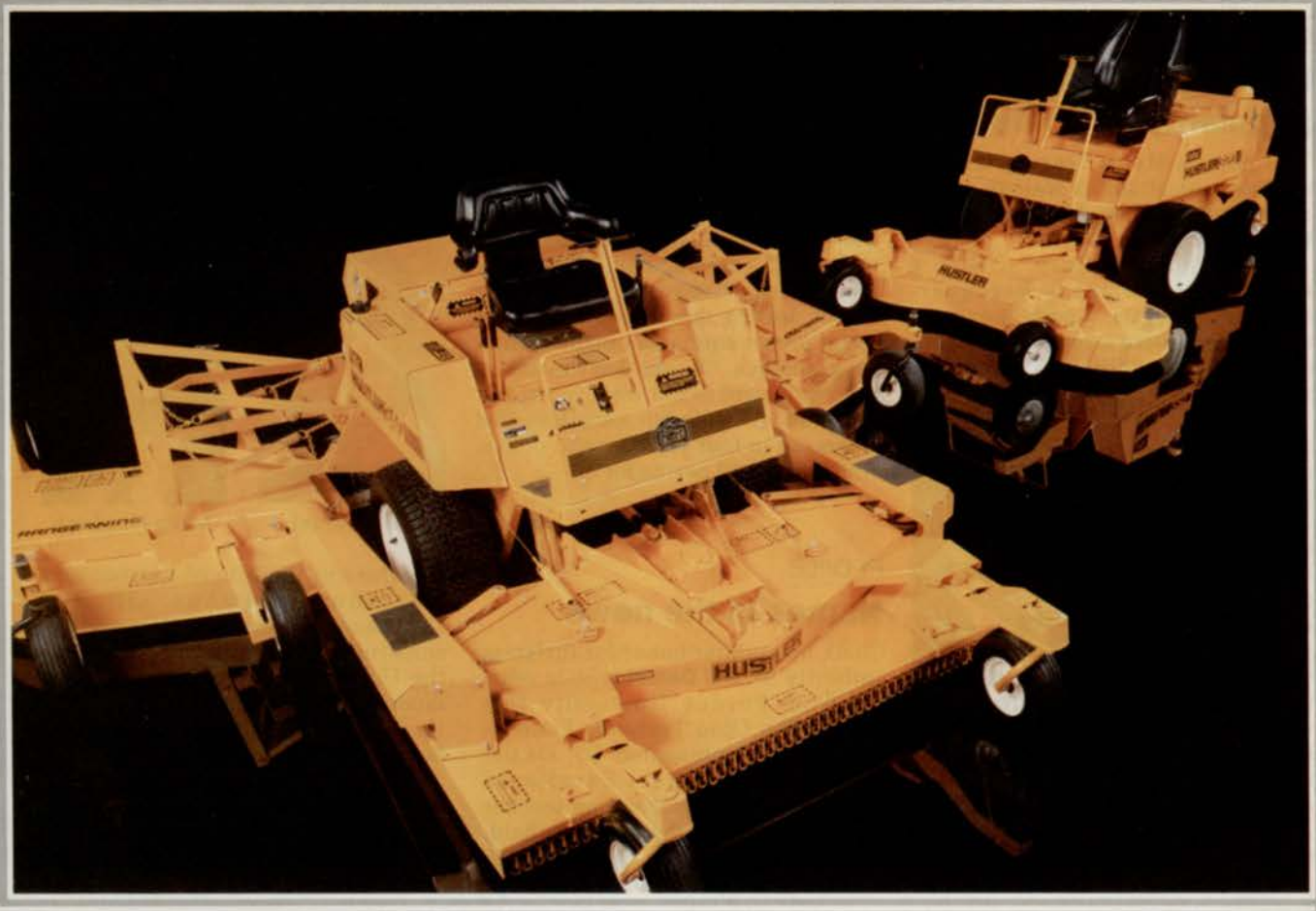
For the first time, turf managers on the West Coast will be getting visits from the white and green Lesco trucks.

The Rocky River, OH, based company is establishing five new "warehouse on wheels" territories, including routes in Palm Springs and San Diego, CA. Lesco, which began serving turf managers by truck in Florida in 1976, should have a total of 32 trucks on the road by midyear. Other new routes include Hartford, CT, the Florida panhandle, and New Orleans.

Says Lesco Vice President Herb Cole, "All those (golf) courses in the new areas we have been serving on a mail-order basis will now have the convenience and the service of buying material directly off the truck

from a salesman trained to make recommendations for a particular area."

Lesco, Inc., a manufacturer and distributor of turfgrass and horticulture equipment and supplies, had truck routes in 15 states prior to this latest expansion.



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GOLF

Leasing is gaining popularity on courses

The popularity of leasing on golf courses, operations as well as equipment, continues to gain strength in the United States.

American Golf Corp. (AGC), a multi-course company headquartered in California, reports it expects to enter into lease arrangements with as many as 20 additional courses this year.

Mike Heacock

Mike Heacock, director of golf course maintenance for AGC, tells *Weeds Trees & Turf* more public courses, financially stung by the recession several years back, are looking to leasing to provide the capital and expertise to keep their facilities top-rate. "Right now the fallout from that (recession) is really hitting us," Heacock reports.

AGC operates more than 50 courses in 11 different states and recently picked up courses in Toledo, OH. AGC runs the whole show when it leases a course. The majority of its agreements are with public courses, but it also maintains private daily fee courses as well as some of its own.

Heacock says equipment leasing has advantages also, the most obvious being the absence of a large initial outlay of cash. AGC leased $2 million in equipment the past two years.

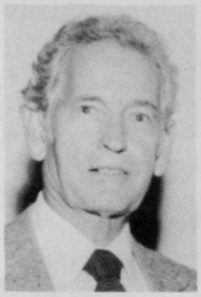
But, leasing doesn't mean you can forget proper equipment maintenance. Says Heacock, "If you don't maintain this equipment as if it were yours, you may find yourself with something that wears out in four years instead of five. And you're still paying for it."

PEOPLE

Names in the news

Chalk up another honor for turfgrass authority **Dr. Bill Daniel** who is retiring from Purdue University this spring. The Ohio Turfgrass Foundation recently presented Dr. Daniel with its Professional Excellence Award. Dr. Daniel, longtime teacher and researcher in the turfgrass field, plans to continue as a consultant for athletic fields, golf courses, and large turfgrass facilities after leaving academia.

Also honored by the Ohio Turfgrass Foundation was **Dr. Mike Hurdzan**, president of the American Society of Golf Course Architects and



Bill Daniel

Mike Hurdzan

a partner in the firm of Kidwell and Hurdzan, Columbus, OH. Dr. Hurdzan has designed and supervised construction of many golf courses in the U.S. including the Dennis Highlands Golf Course (see *WT&T* Jan. 85). He is currently completing a set of books on golf course architecture.

The American Association of Nurserymen (AAN) recently gave its Distinguished Achievement Award to **Herman B. Jackson, Jr.** Jackson, head of the Plant Pest Regulatory Service at

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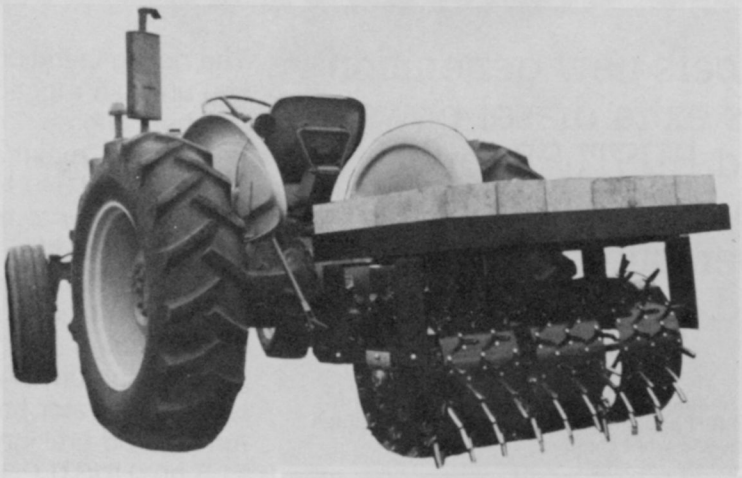

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IN-THE-MIDDLE

Lebanon eyes truckload buyers

Lebanon is changing its marketing direction to make it easier for large fertilizer users to buy directly from the company, Paul Mengle, marketing and sales manager told *Weeds Trees & Turf*. "We have assigned Ed Price and Harry Mathis to codirect sales of Lebanon products to lawn care and other large buyers. Anyone who buys a truckload or more of product can now buy directly from us." A truckload was defined as roughly 15 or more tons. Randy Rogers will direct sales of Country Club and Greenskeeper lines to golf courses.

This is bad news for some small distributors who claim they are losing customers to direct buying. Mengle indicated the move was necessary due to the price sensitivity in the lawn care market and was requested by the companies field sales staff.

The changes are part of Lebanon's "New Directions 86" program. "We are changing from a product orientation to a market orientation emphasizing versatility, reliability, and flexibility," Mengle stated.

Lebanon is a $100 million producer of ammoniated (Ureaformaldehyde) fertilizers, bulk blended fertilizers, and impregnated granular products including herbicides and fungicides.

Adikes hooks up with Host

J. & L. Adikes relationship with Flowertime, a chain of garden centers in New England, is blossoming into a national bonanza for the seed company. General Host, which also owns the chain of Frank's garden centers in the Midwest, bought Flowertime and is setting its sights on becoming the first truly national chain of garden centers in the U.S.

There is the potential in this relationship between Host and Adikes to establish a national outlet for professional turf seed, but this is totally speculation. Currently, seed growers deal with roughly 60 regional seed distributors for national professional sales. Keep your eyes on this new relationship.

GCSAA puts heat on Indiana Turf

As soon as the Golf Course Superintendents Association announced a second show this September in Indianapolis, the phone started ringing at Bob Zwart's Indiana Turf distributorship. It seems that many of the manufacturers of turf equipment whose products Zwart sells, did not budget for such a show and need Indiana Turf to represent them. The short notice by GCSAA has both the manufacturers and Zwart in a squeeze since it would be tough for any regional distributor to represent all its manufacturers at a national show. So far, nobody is giving in, not Zwart, not the manufacturers, and not GCSAA.

In-the-Middle covers the turf and landscape distributor and dealer. Distributors are invited to send news items to Weeds, Trees & Turf, 7500 Old Oak Blvd., Cleveland, OH 44130.

Clemson University, serves as chairman of the National Plant Board and the National Plant Advisory Council, which meets quarterly with the USDA and APHIS.

The AAN also reports that it has created a research grant to honor **F.**

Herman Jackson

Blair R. Crum

Raymond Brush who will retire this August after 27 years with the AAN. The research grant is made possible through interest earned on a contribution from the National Landscape Association.

Blair R. Crum joins Porter Brothers, Inc., Shelby, NC, as vice president for sales and marketing. Crum was most recently vice president for national sales for Weiler Brush Company, Cresco, PA. He is a native of Weirton, WV.

Lesco, Rocky River, OH, announces that **Mike Oleykowski**, Bergenfield, NJ, will be working as its rep in the Hudson Valley, and **Ron Tumiski** from a Lesco truck in the Boston area. Tumiski lives in Canton, MA.

Wins a Classic

Greg Bergwin of Ridglea Country Club, Ft. Worth, TX, took home an OMC Lincoln classic 1964 Cushman Golfster from the Golf Course Superintendents Association of America Show recently. Bergwin won the collector's item in a drawing of about 1,000 entrants sponsored by the company.

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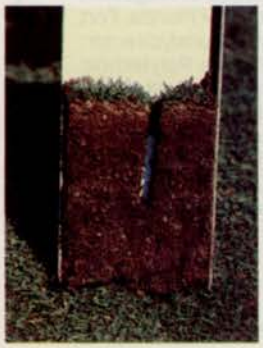

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LANDSCAPE LOG

by the Editorial Advisory Board, *Weeds Trees & Turf* magazine

May work keys on summer protection

Seven experts willingly share their knowledge. Please write the magazine if there are specific areas of landscape management you would like to see addressed on a monthly basis.

Mid-Atlantic landscape managers begin preparing for summer heat stress in May. John Hall of VPI suggests raising mower cutting height beginning in May for cool-season grasses. He recommends aerification and verticutting for both cool- and warm-season grasses in May, followed by fertilization and application of postemergence herbicides for crabgrass where preemergence applications did not provide control. May is a good time to begin sprigging and sodding repairs to bermudagrass turf according to Hall.

Areas with a history of grub, cutworm, armyworm, billbug, or sod webworm should be sprayed in May. A second application of fungicides for leaf spot control may be needed.

Great Plains landscape managers should initiate fertilization of warm-season grasses and cool-season grasses which received a late-season fertilization the previous year. Broadleaf weed control should switch to postemergence herbicides no later than mid-May, says Bob Shearman of the University of Nebraska. Fungicide applications should be made for leaf spot, melting out, and stripe smut. Adult bluegrass billbugs may be controlled in May with insecticides.

Shearman recommends insecticide applications for scale crawlers on affected ornamentals in May, in addition to control of cankerworms, tent caterpillars, borers, and aphids.

Ornamental disease control should begin for black spot on roses and rust and scab of crabapples. Peonies should be sprayed with Bordeaux mix after flowers emerge.

Fertilize roses and spring flowering plants in May and prune them after they finish blooming.

Trees needing attention in May are pines for Diplodia tip blight and pine needle blight, junipers for Phomopsis blight, birch for bronze birch borer, and honeylocusts for insects.

Northeast landscape managers should concentrate on soil conditions in early May, says Martin Petrovic at Cornell. Dethatching, coring, pH control, light fertilization, and deep watering are important now.

In the northernmost portions of the Northeast preemergence herbicides are still being applied. In most areas, however, control has switched over to postemergence broadleaf herbicides.

Disease or insect prone areas should be watched closely for symptoms and damage. Leaf spot, dollar spot, stripe smut, and summer patch (hot weather Fusarium blight) are all possible in May. White grubs, chinch bugs, sod webworms, bluegrass billbugs, and hyperodes weevil are all problems at this time and may require treatment.

Deep watering and fertilization of trees and shrubs are important in May says Petrovic. Narrow-leaved evergreens can be pruned in May.

Insects to control are aphids, birch leaf miner, dogwood borer, forest tent caterpillar, gypsy moth, and lilac borer. Diseases of trees and shrubs to control include fire blight, anthracnose, leaf blotch, and leaf spot.

In preparation for June work, order fungicides for pythium and brown patch of turf.

North Central landscape managers should have plans for annual beds finished and plants ordered for installation in May, says Doug Chapman of Dow Gardens. Transplanting of trees and shrubs should be limited to container and balled-and-burlapped plants.

If cool and wet conditions exist, apply sprays for apple scab and Phomopsis twig blight. Deciduous shrubs can be pruned immediately after flowering. Spray vulnerable stages of chewing and sucking insects.

Midwest landscape managers should follow tips for the Great Plains. Harry Niemczyk, Ohio State University turf entomologist, suggests attention to grub prevention and mite damage to turf. He says preventative treatment for chinchbugs and billbugs should be down by May 10.

Florida landscape managers have experienced a record dry winter says Bruce Augustin, extension turf and water specialist at the University of Florida. Water restrictions may be possible if rains don't occur before May.

Augustin suggests cutting heights for St. Augustine and bahiagrass be raised to 3 inches. Bermudagrass greens should not be cut lower than 3/16-inch warns Augustin. Verticutting and aerification are recommended for thatchy turf since recovery is fastest in warm temperatures.

Turf areas should receive 3/4-1-inch of water twice per week in May. Fertilization should be withheld until the rainy season begins in mid-June. Herbicides should be applied very cautiously if drought continues.

Chinchbugs are especially troublesome in May says Augustin. He recommends cautious use of organophosphate insecticides due to resistance problems.

Pruning of trees and shrubs to improve appearance and reduce wind resistance is appropriate in May. **WT&T**

Editorial Advisory Board members are: **Bruce J. Augustin**, extension turf and water specialist, University of Florida, Fort Lauderdale, FL; **Douglas Chapman**, horticulturist/director, Dow Gardens, Midland, MI; **Jack Hall**, Virginia Polytechnic Institute and State University, Blacksburg, VA; **Kent Kurtz**, professor of horticulture, California Polytechnic Institute, Pomona, CA; **Harry Niemczyk**, professor of entomology, Ohio State University, Wooster, OH; **Martin Petrovic**, assistant professor of turfgrass science, Cornell University, Ithaca, NY; **Robert Shearman**, associate professor or turf, University of Nebraska, Lincoln, NE

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Turf regulator eases mall landscape tasks

Carol Zech, horticultural supervisor for Twelve Oaks Mall in Novi, MI, found herself with a vexing landscape problem—too much lush grass.

Zech and her crew (four full-time and three part-time employees) were spending too much time mowing.

Says Zech, "Last spring, because of heavy fertilization the previous year and steady rains, grass growth was nothing less than astounding. We did so much mowing there was little time left to edge, prune, mulch, and spray."

The logical way she is solving it demonstrates the value of a clearly defined program using a new product, Monsanto's turf regulator, Limit.

Her problem is probably not unique. Saavy merchants are beginning to realize the value of oases of green in the vast concrete expanses of shopping mall parking lots.

Trees, grass, shrubbery and flowers add beauty (creating a positive initial reaction with incoming customers) while directing traffic, reducing noise, and absorbing vehicle fumes.

But more landscaping means more work for people like Zech at the 1.2 million sq. ft. Twelve Oaks Mall with its extensive multi-level parking area which is dotted with landscaped traffic islands. Compounding the problem, several of the maintained grassy areas have a 35 to 40 degree grade. "I grit my teeth every time the crew mows them. The less I have to do to those areas, the better," she says.

Last May, Zech and a staff member applied 20 gallons of Limit, a chemical designed to slow the growth of cool-season grasses, from a trailer-mounted sprayer to the quarter acre traffic islands and the top and bottom of an inclined turf area. The turf is a mix of Kentucky bluegrass hybrids. "Before using Limit, I was very worried about the toxicity of growth regulators," she admits.

A few days after she applied the Limit, the only discoloration she noticed was a slight blue-gray tinge. This was offset by other favorable results.

"During the six-week period following the application of Limit, turf growth was slowed noticeably," she says. "Ordinarily, heavy spring growth would force us to mow every six days. However, after we applied Limit, we found ourselves trimming every other week. The grass was thinner and the clippings drastically reduced. My crew thought it was great." Equally welcome, the top and bottom of the graded grassy area Zech sprayed required only one trim mowing in a six-week period. This year she plans to spray the turf regulator on other heavy growth inclined areas in addition to the traffic islands.

Zech is also responsible for refuse removal around the mall and has been concerned with the safety hazards of mowing grass that hides bottles and cans. "If we can reduce the number of mowings, there is less chance one of my crew will accidentally run over a bottle or can and injure himself or someone else, not to mention the damage done to machinery."

Above all, reducing mowings this spring will allow Zech to devote more time to other jobs. **WT&T**

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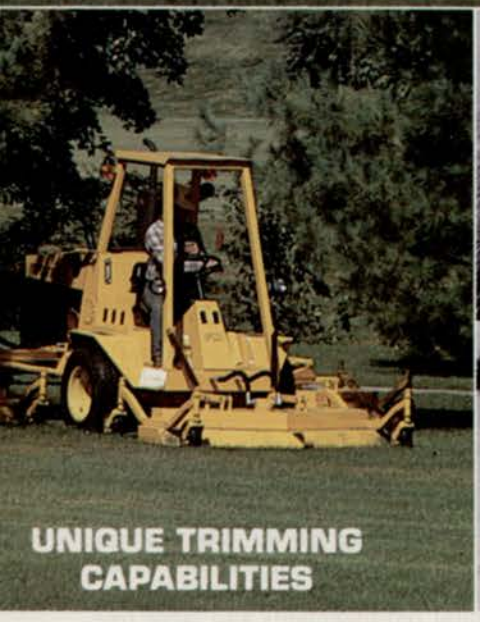

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LANDSCAPE MANAGEMENT

Public opinion, worker attitudes and increasing governmental regulation are forging a new path for government managers. The challenge isn't going unanswered.

The Government Dilemma: Agronomics vs. Budgets

by **Maureen Hrehocik**, managing editor

A whole laundry list of concerns is on the minds of government landscape managers across the country.

Frozen budgets, battling the overall economy, pesticide regulation and responsible use of chemicals, a rapidly changing industry, public and employee attitudes, professionalism and education of government landscape managers and their employees, and lack of water top the list according to a WEEDS TREES & TURF survey.

Doing more with less was the overall concern of most managers who responded.

One city landscape manager seemed to sum up the sentiments of many. "We have to consistently produce the quality product, (athletic fields, landscaping, mowing, park maintenance) which the general public and taxpayer have come to expect with increasingly dwindling budgets and crews."

And most know there are no easy answers.

Says another, "We have to be able to sell ourselves to those people in the government who control the budget and make decisions where the money goes. I think landscape management will have an even more difficult time being recognized by the government with all areas that are being cut back (from) federal support."

A profile

Most respondents to the survey were in managerial positions with an average of 11 years in the industry. Most were involved in city landscape management with state employees following a close second.

They supervise an average landscape crew of 11 (a high of 50, low of 1). Over the past two years the landscape crew size has pretty much stayed the same, although 20 percent said their crew had decreased (one by as much as 2/3) and only a few reported increases.

With the static crew size comes an increase in total acreage to be maintained. Results here varied greatly because of the scope of some state government managers in particular. However, our respondents, on the average, managed 889 acres (a high of 10,000 acres, a low of 3). An average of 34 acres of that is devoted to athletic fields. (A few respondents noted volunteer help played somewhat of a role in the maintenance of athletic fields, but the majority were done by city and state crews as part of the regular maintenance schedule).

TABLE 1

Importance of Duties Performed

	Very Important	Important	Not Important
Roadside Maintenance	23%	43%	44%
Athletic Fields	64%	14%	22%
Buildings (Outdoor Maint.)	40%	30%	30%
Buildings (Indoor Maint.)	54%	23%	23%
Park Maintenance	48%	23%	29%
School Maintenance	34%	.08%	65.29%
Turf Management	51%	39%	10%
Tree Management	51%	43%	6%
Street Maintenance	21%	34%	45%
Snow Removal	39%	.13%	60.87%
Golf Course(s)	.8%	8%	84%
Military Installation	0	41%	59%
Airport	3%	9%	88%
Cemetery	19%	11%	70%

Intensive care

Respondents were asked to rank by importance certain maintenance areas. Athletic field maintenance, turf and tree management (tie) and indoor building maintenance ranked as "Very Important"; roadside maintenance and tree management (tie), military installations, and turf management ranked in the top three as "Important"; and airports, cemeteries and school maintenance ranked in the top three as "Not Important". (See Table 1)

Plant and landscape installation and tree trimming are the jobs that get contracted out the most. Tree spraying, paving and asphalting, capital improvements and large tree fertilization and removal were also jobs most government landscape managers contracted out.

The budget

Survey results show January, March and February are the months in which most budget planning is done.

About half of the respondents pre-

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LIMIT goes to work in the spring when you need help the most.

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LIMIT can save valuable time.

LIMIT can be used in numerous ways to cut back on valuable labor hours...on broad expanses of low-traffic turf such as golf course roughs, campuses or institutional grounds and industrial parks as well as smaller, hard-to-mow areas where obstacles such as trees, shrubs or monuments are present.

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LIMIT is versatile and easy to use.

Your options are open. LIMIT can be used with either water or fluid based fertilizers and in conjunction with commonly used turf herbicides.

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dict their budgets will stay the same in 1986, with 1/4 predicting an increase. Again, the 1985 budget amounts were scattered across the board; from a high of $8 million to a low of $1,500. About 1/4 of that budget goes for roadside vegetation management and about 14 percent is earmarked for tree maintenance.

Funding comes from a variety of sources, but in a majority of cases from part of the city budget. In other cases, user fees, state agencies, special taxes, cemetery lot sales and interments, and gasoline taxes provide the funding.

The 1985 budget amounts were scattered across the board; from a high of $8 million to a low of $1,500. About 1/4 of that budget goes for roadside vegetation management.

What is your primary source of information for new seed varieties, chemicals and equipment?

1. Trade Magazines
2. Local Distributors
3. Fellow Superintendents and Managers
4. (A combination of the above 3)

What types of jobs do you contract out?

- Plant and landscape installation
- Tree trimming
- Tree spraying
- Paving

Chemicals, equipment

A concern for proper chemical and pesticide use was apparent from many of the respondents. Says one, "We have to stop using as many and as much herbicides and insecticides and start finding safer and public supported alternatives."

But another laments, "I was asked not to buy or apply fertilizer for the '85-'86 fiscal year. We bought none in '84-'85 and our supply is almost gone. Our best turf areas are starting to look like our worst."

Fertilizers top the list as the chemical used the most as a regular part of most landscape maintenance programs. (In another WEEDS TREES & TURF survey of a larger reader base conducted by a national readership research firm, projections for a total expenditures in 1985 for dry-applied turf fertilizer will be $34,200,00; for liquid-applied, $5,340,000.) Herbicides for turf weed control are second, herbicides for total vegetation control are third. (Projected 1985 expenditures for pre-emergence herbicides are $7,210,000; for post-emergents, $9,840,000.) Turf insecticides, tree insecticides, wetting agents, fungicides and growth regulators round out the list. (Projections for 1985 expenditures in these areas are: turf insecticides, $3,710,000; tree insecticides, $5,580,000; wetting agents, $616,000; fungicides, $3,970,000; and growth regulators, $1,500,000).

A majority of respondents recommend, specify and purchase seed, chemicals and equipment. In only a few cases were the recommendation and specification responsibility left to someone else.

In 86 percent of the cases, equipment is purchased under bid. A little more than half the respondents purchased their chemicals under bid. A handful made seed purchases under bid.

Chain saws are the most common piece of equipment owned by the respondents (91 percent), small push mowers and large riding mowers are the second most important pieces of machinery owned (87 percent) and dump trucks are owned by the departments of 78 percent of the respondents.

Other equipment includes: chemical spreaders (74 percent); tree or turf sprayers (70 percent); turf aerifiers or corers (60 percent); large walk-behind mowers (49 percent); wood chippers (38 percent); and trenchers (30 percent).

Challenges ahead

It's not only the nuts and bolts of budgets, equipment maintenance, chemical purchases, and work schedules that are vying for the where-with-all of government landscape managers. They also have to be molders of public opinion.

One southeastern landscape manager said, "One of our most important tasks is getting people to understand quality landscapes take time and money."

Another concurs. "We have to educate the public about the long-term costs of landscape maintenance; specifically that landscapes are dynamic living systems which need constant care at a consistent level, *plus* periodic upgrade if the landscape is to be kept in top condition."

Government landscape managers have also set goals and challenges among their own ranks, acknowledging their own responsiblity to their profession. Says one,"We have to keep ourselves aware of improved products suitable to be used around the public and wildlife, ie. protect the delicate balance of nature in the water, marsh and birdlife."

One of our most important tasks is getting people to understand quality landscapes take time and money."

And closer to home, many of the managers responding said improved employee relations and work attitudes were a high priority.

"We have to educate our younger people coming into the field better to give us a better image in the eyes of the public," responds one manager. "We as an industry have to take pride in our work and pride in our profession. It starts with us." **WT&T**

A private organization joins hands with the City of New York to breath new life into Manhattan's green jewel.

Central Park...One of a Kind

by **Ron Hall**, assistant editor

Park maintenance problems! How about 14 million visitors a year? Or Miss Piggy doing $1,700 damage to the plant life during the filming of her celebrated Manhattan movie a while back?

Central Park has problems that are either uniquely large, or just unique.

Solutions to these problems are equally unusual, including the unlikely marriage and cooperation of a public and a private agency. The public NY Parks Department and the private four-year-old Central Park Conservancy have joined forces in the restoration of New York's 840-acre sanctuary. Central Park is being returned to what the park's improbable creator Fredrick Law Olmsted (he had tried his hand at farming and publishing, both unsuccessfully, prior to gaining fame) envisioned some 127 years ago in his now-famous "Greensward" plan which resulted in the the first public park in the country.

Olmsted wrote that he felt New Yorkers, even then with the city *just* 370,000 strong, needed "a sense of enlarged freedom," a place "to recreate the mind from urban oppression through the eye."

A place apart and away from the hustle of the city. That's what Olmsted sought; that's what he accomplished.

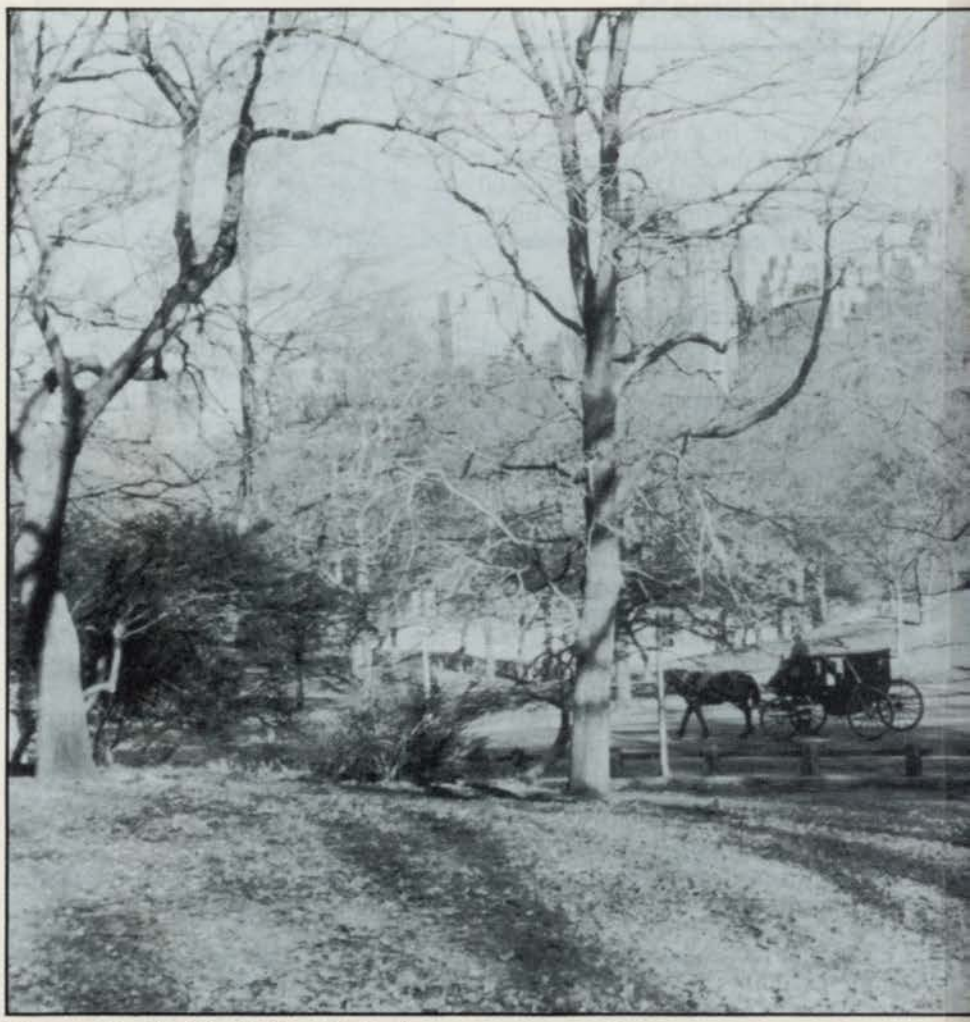
That's what was almost lost.

Stricter management

It's coming together nicely now, thanks to a rejuvenated NY Parks Department, the Conservancy (which convinced prestigious foundations to support the Park like other NY treasures) and young minds like Director of Horticulture Frank Serpe and his deputy John Hart, who this frigid winter day are mulling the liberties Miss Piggy (more accurately, her film crew) took with Central Park's turf and shrubs.

"We're the ones that need the say over something like that," Serpe snaps as he eases the blue van up a snow-covered path in the Park. "It's up to us to say what we're going to allow to be done in the Park. And how it's going to be done."

Serpe's stand reflects a tough new management and maintenance philosophy in Central Park, based in part on economics. In four years the Conservancy has pumped more than $6 million in private funds to help the Park recapture its 19th century charm. In 1984 the City spent $6.6 million, the Conservancy added $1.2 mil



The unmistakeable skyline *of Manhattan's green jewel.*

lion for capital construction work.

That means stricter management of the park's resources. Surveys show that's what New Yorkers want.

To one survey, 80 percent of those polled indicate they come to the Park "for passive recreation." Although it is used by thousands of joggers and bicyclists daily, and contains 26 baseball diamonds, 30 tennis courts, and 23 playgrounds, much of its restoration is aimed at trees, shrubs, and turf.

New Yorkers care

New Yorkers do care for the green life in the Park as evidenced by grants—like the $1 million provided by the late John Lennon's wife, Yoko Ono, for the creation of a small wooded preserve called "Strawberry Fields"—and thousands of hours of volunteer labor, over 4,000 in 1984 alone.

Frank Serpe and John Hart— *committed to keeping Central Park "naturalistic."*

Central Park's rebirth is sparked by the privately funded Central Park Conservancy

As Serpe and sidekick John Hart coast along the Park's meandering trails in the blue van evidences of restoration are everywhere. Archways, skating rinks, rustic shelters; name it and chances are it's getting fixed.

But, Serpe's speciality is plantlife and his goal is lofty, if admittedly a bit unrealistic.

"When people walk in off the streets I want to give them the feeling that they're in the Adirondacks. Hey, I know it can't be the Adirondacks but we can give them that feeling," he says. "I'm not interested in making it a botanical garden but we want to make it as naturalistic as possible, a place where people can come and enjoy all the wildlife."

Trees catalogued

New techniques aid Serpe and other park workers. Computors are used as management tools with a complete inventory of every tree in the park over 6 inches—its condition, location, size, and type—accessible at a finger tip. There are 24,000 trees in the Park, including 2,000 American elms, and use of the computer and a regulated visual inspection routine have reduced tree mortality significantly. Other cities, including Washington D.C. are using Central Park's system as a model.

Recent surveys have also catalogued animal and bird populations, but Central Park holds surprises even for the experts.

"I saw a parrot. I saw a parrot I tell ya," Serpe, a self-confessed "bird nut" says to skeptical Hart. Down goes the coffee, out the van door goes Serpe, up over a fence to the base of a naked 30-ft. black cherry tree. There it is, bright green, about the size of a 16-oz Pepsi bottle.

"Still looking for our first leopard though," Hart tosses off nonchalantly as Serpe attempts to whistle the curious parrot to his waiting arm.

Not quite an Oscar Madison-Felix Unger combination, but close enough.

Serpe is a New Yorker, a "West Chesterite," he corrects. He's been working with plants since he was a toddler (his dad's an arborist). The intense, slender Serpe, a University of Connecticut graduate, limits himself to one cup of coffee daily, ("I promised my wife") and usually swallows his lunch by mid-morning ("he's too nervous to wait," a co-worker explains).

Bewhiskered Hart, a well-travelled Kansas native who now serves

as deputy director of horticulture, took a circuitous route to the Big Apple, including a stint as grounds management supervisor at a South Dakota campus, five years in sunny Sarasota, and some work on a private estate in New England. Hart, the holder of a Masters degree from Michigan, is a day-at-a-time kind of guy.

They're a big part of the story. But, the rebirth of Central Park is molded by fascinating personalities, people like silver-haired whirlwind Lynden Miller. The Conservatory Garden, a stylized English border garden in the Park's northeast corner (right across from Harlem) is her baby. Few babies receive such attention. This garden is budgeted about $50,000 annually.

"What we lost in this park was not the trees but the understory"

—Serpe

The fashionably attractive Miller, with a park employee scrambling to keep pace behind a wheelbarrow of mulch, buzzes to clumps of sagging plantlife (it's 20 degrees and blowing like crazy), all the while keeping up a furiously animated conversation with Serpe.

"She's really something," Hart says almost in awe.

So is the Conservatory Garden. Even in winter it's a showcase of Miller's efforts, and those of the New York committee of the Garden Club of America which began its rescue several years ago.

In the spring it's ablaze with color, first crocus, then 20,000 hybrid tulips. Summer brings the planting of pink and white geraniums and fall features the spectacle of 20,000 Korean mums. Mix in some annuals such as blue salvia, snapdragon, and cleome. Conservatory Garden is just one of Central Park's recent success stories.

Another is an area called Long Point, a finger of land sticking into a small lake popular with the rowboat set. Park workers reset all the old edging stones along the shore line while adding 5,000 pieces of plant material to the small peninsula, species such as bayberry, blueberry, and Russian olive. Thorny ornamentals discourage foot traffic in environmentally fragile areas.

Serpe and Hart say the reestablishment of the Park's understory is cornerstone of their work. Says Serpe: "What we lost in this park was not the trees but the understory. We just lost it, the shrubs, the flowering plants, the grass. Some areas of this park were just like a desert."

With the planting of 30,000 shrubs, 200,000 bulbs, and 400 understory trees (species such as dogwood, mountain laurel and redbud), Central Park is beginning to approach the look Serpe seeks. "We try to stay with naturalistic plant material. But, it is not necessarily native and we've had some trouble finding some of this material in the nurseries."

Turf restoration

Popular turf areas in the park have been getting more attention too. This is where the new aggressive maintenance spirit is most evident. A former dustbowl, the Sheep Meadow is now a handsome turf area groomed for beauty and passive pursuits such as picnicking and sun bathing. Irrigation is supplied by Toro pop-up sprinklers, and fertilizer and lime are administered according to soil tests taken each spring and fall.

The success of the turf in the Sheep Meadow caused park administrators to upgrade the three-acre East Green as well. "They're calling it a revolutionary type of turf area, but it really isn't," Serpe says. "It's a sand concept area and a lot of athletic fields are similar, with extensive irrigation and good drainage." Workers brought in 1,620 cubic yards of sand and laid 2,750 feet of drainage pipe in this one area.

"It can't be the Adirondacks, but we can give visitors that feeling"

—Serpe

Use of the East Green, like that of the Sheep Meadow, is going to be carefully monitored. "We can close 'em down anytime we need to," Serpe says. Sturdy fences with padlocked gates encircle the grassy areas.

And the classy Mall, lined with stately American elms, is finally green again. The seven-acre area is regularly overseeded with Houndog, a turf-type tall fescue. The Great Lawn (the scene of massive rock concerts and anti-nuclear demonstrations and dubbed the "Not So Great Lawn" by some critics) could be their next turf restoration project.

"They're calling it a revolutionary type of turf area, but it really isn't. It's a sand concept area."

—Serpe

Problem areas

While the marriage of Conservancy and parks department has been a good one so far, not every project has been successful. The seeding of 10 acres of wildflower meadows hasn't lived up to expectations, but there's still hope since Serpe feels it might take three to five years to develop a good stand of wildflowers.

Serpe and Hart deal with a workforce of 12 persons year-round, 16 during the summer. Additional high school students help in the peak season. Serpe's budget breaks down to about $300,000 for tree care, $200,000 for horticultural maintenance, and $124,000 for turf care.

The Park has come a long way since Frederick Law Olmsted and Calvert Vaux won a design competition in 1858, and workmen spent 16 years carting in nearly 5 million cubic yards of stone, earth and topsoil to turn a patchwork of stone quarries, fetid swamps, and pigsties into one of the world's most celebrated locations. They planted 500,000 trees, shrubs, and vines.

Olmsted's dream almost died and so did the Park in the early 1970s because of apathy, management with a laissez-faire attitude, and New York's financial woes which dried up funds for proper maintenance. That's changing in a big way.

"Everything had to be carted in to make this park," Hart reflects. "I guess you can call it a huge flowerpot."

Finally, it's starting to look like one again. **WT&T**

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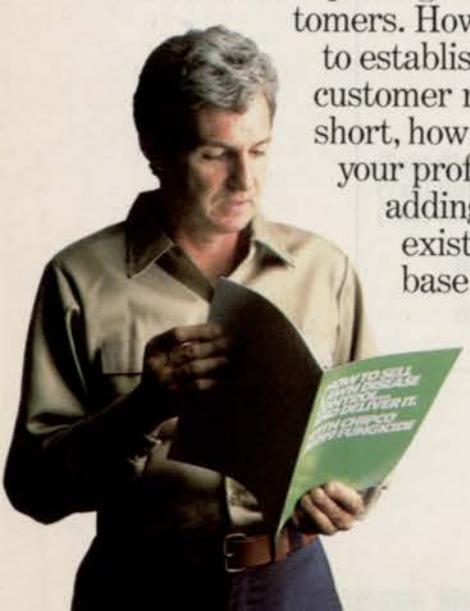

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LANDSCAPE MANAGEMENT

Despite few disease and insect problems, the South Pacific's endless growing season poses a special mission to Jonathan Kajiwara, entomologist at Hickam Air Force Base on the Hawaiian island of Oahu.

An Unrelenting Challenge

by Maureen Hrehocik, managing editor

If you squint as the plane touches down on the coral reef runway at Honolulu International Airport you can see golfers teeing off at Hickam Air Force Base.

The roar of commercial as well as military jets overhead doesn't seem to bother the steady stream of people waiting to line up their shot down the fairway.

It's almost as if *every* golf course is located right alongside one of the country's busiest airports.

The amount of play on the two courses (one is a Par 3) keeps general manager Sammy Souza and his crews busy. The courses as well as all other landscaping on the base also fall under the domain of Jonathan Kajiwara, entomologist of the Pacific Air Command, Air Force unit on the island of Oahu.

His responsibilities encompass bases in Hawaii, Guam, Japan, Korea, the Philippines and other South Pacific islands—seven in all.

Kajiwara, a slight, unassuming man, acts as a consultant to the seven bases and oversees all functions "necessary to run a small city."

Based in the engineering depart-

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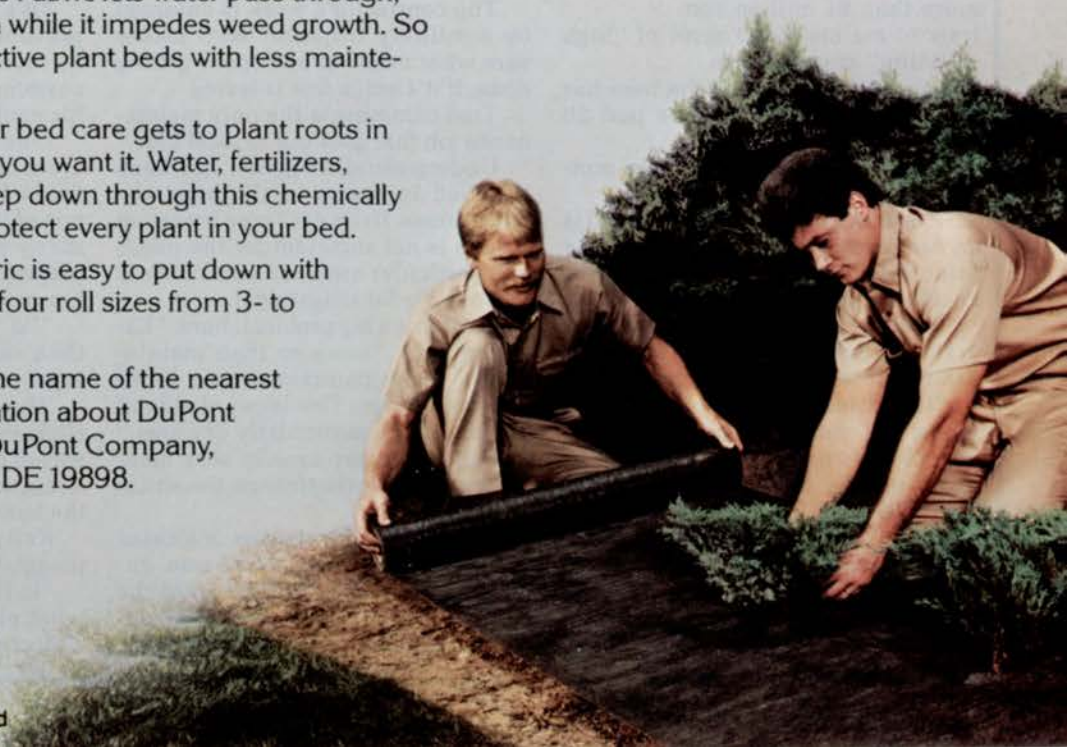

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ment, Kajiwara says he supports the engineering function at each base, which includes the landscape work.

Extremely mild tropical temperatures all year, few disease and insect problems and breathtaking vistas of ocean and mountains would make it seem Kajiwara was sitting in a landscaper's paradise.

Not quite.

It's the beautiful weather that, ironically, poses Kajiwara's main agronomic problem.

"Because of our year-round almost constant warm temperatures, everything grows well here," Kajiwara attests. "Maintenance is a year-round job. Coconut tree trimming alone is tremendously time consuming and expensive. We do it twice a year."

The climate is technically subtropical, but in reality, it's more tropical.

The "winter" season is from late September through February. The temperatures are lower in the nightime (60s) and it rains more. Grass-growing is diminished, but turf in Hawaii never really goes dormant.

$1 million contract

Management Technical Services, a California-based company, holds the more than $1 million contract to maintain 400 acres of "high visibility" areas on base.

Landscaping work at the base has been contracted out for the past 20 years.

Enlisted personnel maintain non-contracted areas.

The entire base is 4,000 acres and is an Air Force major command and the principal air arm of the United States Pacific Command.

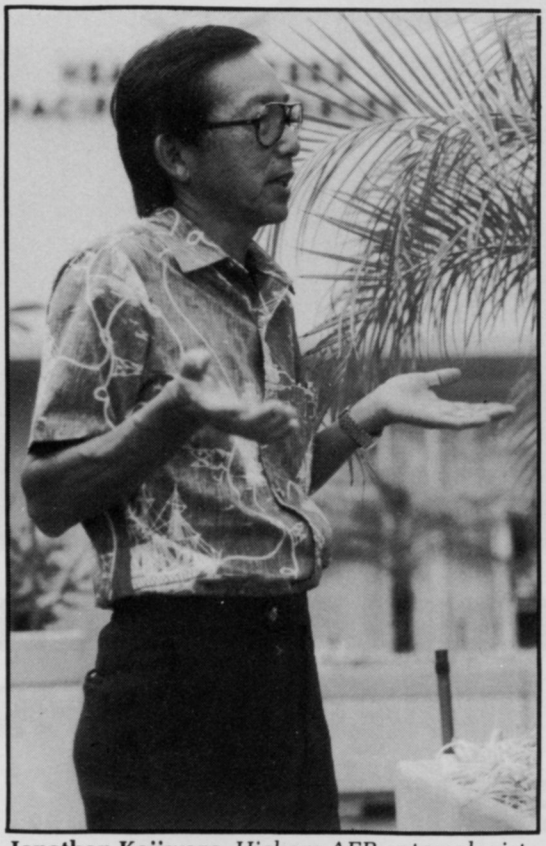
Most of the turf is bermudagrass with some St. Augustine and kikuyugrass.

"Our disease problems are mainly on the golf course (helminthosporium was cited), and are pretty similar to those on the mainland," Kajiwara said. "Diseases in general are not a problem."

Major weed problems come in the form of crabgrass and purple nutsedge.

What is a problem, according to Kajiwara, is finding qualified help.

"It's not an easy thing here in the islands," he says. "We even have trouble keeping a contractor once they start working on the contract. They find the job is much more demanding than they thought it would be."



Jonathan Kajiwara, *Hickam AFB entomologist*

The contractor's work is enforced by a military inspector who makes sure what needs to be done is getting done. If it's not, a fine is levied.

Tree trimming is the only maintenance job that goes out to local bid.

Underground irrigation has been installed in lawns in the high visibility areas. If the Air Force irrigation system is not sufficient for the needs of a particular area, the contractor is responsible for irrigating it.

"Water is a big problem, here," Kajiwara says, "more so than maintenance. Some contractors use water guns and hoses. The leeward side of the island is a particularly dry area."

Every summer usually sees mandatory water restrictions on the entire island of Oahu.

The area where Hickam is located gets about eight inches of rain annually. A mere five miles toward the mountain, that figure jumps to a staggering 130 inches of rainfall a year.

Plant selection

Kajiwara's criteria for plant selection is simple—it must survive under any condition with minimal maintenance.

Because of the structure and budgeting of the military, landscaping is not an over-endowed area of the budget. What doesn't fall under the contractor's realm the military takes care of. Often, experience and expertise in agronomy is limited.

Around the front of the base headquarters building, Kajiwara has chosen Phoenix and MacArthur palms planted in large containers in a courtyard-like front entrance. In the planters with the palms is variegated mondo grass, Hawaiian fern and lawai fern. The self-contained planters provide a neat appearance for the front entrance while adding a touch of native green vegetation.

Grass growing (in winter) is diminished, but turf in Hawaii never really goes dormant.

Jim McMurtrey of B. Hayman Co., Inc., a Jacobsen distributor, says machinery in Hawaii gets a workout six to seven days a week, up to 365 days a year.

"It's a fix-it situation rather than a preventive maintenance situation," he says. "You really must inform the customer on how to get utility out of his equipment."

One of the high maintenance areas of the base are the nine athletic fields. Baseball fields, especially, are one of the most popular spots with as many as three games a day being played. All the baseball fields are bermudagrass.

"I'd say our fields get more play than most public fields," Kajiwara says.

The majority of landscaping at Hickam is Spartan; the military has a way of cutting to the bone. In the constraints of a military setting, though, the base is well manicured.

Kajiwara assesses the situation pragmatically.

"In Hawaii, you learn to work with what nature gives you—and then to expect surprises." **WT&T**

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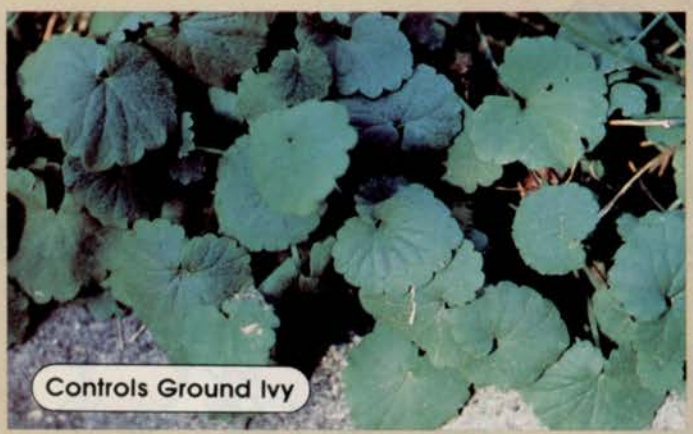

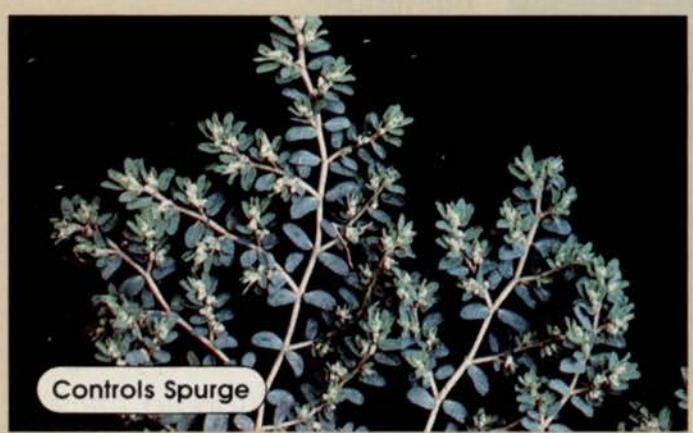

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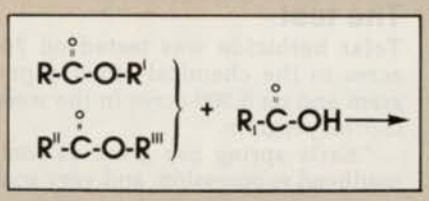

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Circle No. 147 on Reader Inquiry Card

LANDSCAPE MANAGEMENT

The Chemical Connection

The Indiana Highway Department proves in some cases chemicals can be more productive and cost effective than mowing.

by Art Edwards

John Burkhardt, *landscape supervisor.*

A new weed control program tested in Indiana may help reduce highway mowing in that state—and keep more cash in the maintenance budget.

"We find we can spray and get good weed control at $12 to $13 per acre, says John P. Burkhardt, landscape supervisor for the state's Division of Maintenance. "This is weed control only—but it wipes out wild carrot, a most showy weed problem, and sweet clover which also is a noticeable, up-front type. Canadian thistle is another problem weed showing control at this low per-acre cost."

The compound being tested is Du Pont's new Telar herbicide, a dry flowable formulation recently labeled for use on highway rights-of-way. Indiana's highway maintenance group has been one of the leaders in extensive field work with the product, both for weed control and in chemical mowing.

The present program in Indiana is a combination of mowing and spraying.

Two-pronged attack

The present program in Indiana is a combination of mowing and spraying. Spraying is done in the spring for annual broadleaves and in the fall for the hardy perennials.

Spraying for the last 12 years has been on a three-year cycle: interstate highways one year; half the two-lane roads the next year; and the second half the third year.

Indiana highway maintenance has begun to phase in a two-year spray cycle: interstate one year and other highways the next. With an effective chemical spray program and two to three limited mowings per year, Burkhardt believes the new cycle will prove feasible.

With the new spray program Indiana's Division of Maintenance may be able to eliminate one mechanical mowing per year on the acreage it maintains. This could produce big savings in any given season. The system totals 100,000 acres, although not all of the acreage is mowed each season.

"We want weed control ... wild carrot, sweet clover, and canadian thistle are our key problems."
—Burkhardt

The test

Telar herbicide was tested on 700 acres in the chemical mowing program and on 5,500 acres in the weed control program.

"Early spring use gives us some seedhead suppression, and very good suppression with Embark added," Burkhardt says.

Embark is a growth regulator marketed by 3M.

But he points out that these extra benefits aren't the primary reason for using Telar.

Art Edwards is the former publisher of WEEDS TREES & TURF.

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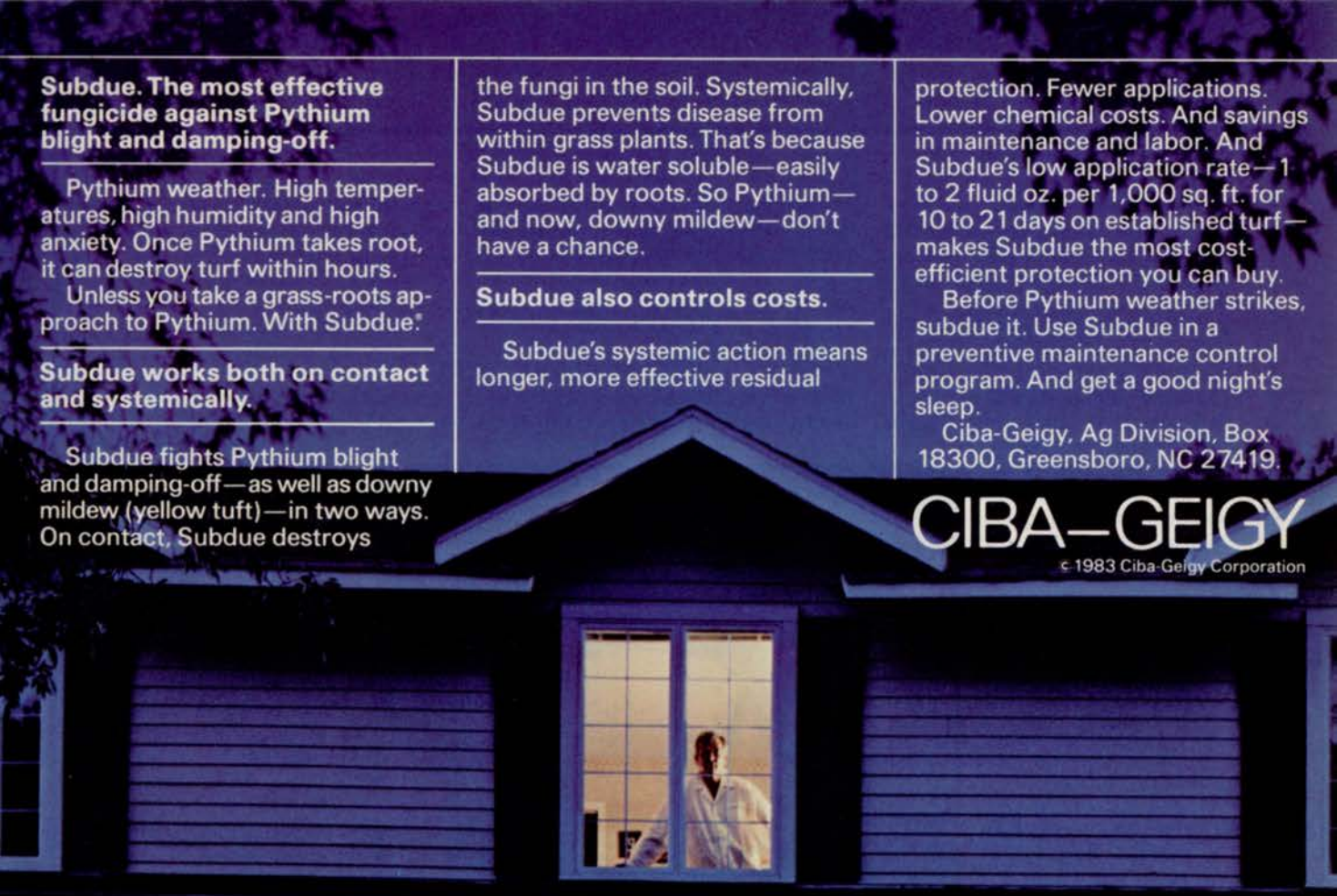


HOW TO AVOID SLEEPLESS NIGHTS DURING PYTHIUM WEATHER.

SUBDUE

Circle No. 274 on Reader Inquiry Card

"We want weed control," he says. "Wild carrot is our key problem, since it grows to about three feet. We are getting almost total control with Telar."

Burhardt says this control holds for other problem weeds like sweet clover and Canadian thistle as well.

The new compound has proven to be very selective. Used alone, it gives good control on those weeds for which it is labeled. If used with 2,4-D, the experience in Indiana is that the spectrum of control is broadened considerably."

Telar is used on contract acreage—that acreage sprayed by private contractors on a bid basis—at one-third ounce per acre along with one-half gallon of 2,4-D amine. Telar costs about $12 per ounce.

"We can kill wild carrot with other chemicals but not at this low cost," Burkhardt says.

He also notes that a lesser rate, one-fourth ounce per acre in combination with 2,4-D, has also proven effective in some instances.

Other rates tried by the department's own crew have ranged up to one ounce per acre. At the higher rates, Burkhardt says the new chemical also displays some growth regulation which is commendable, but that this is not the present goal of the program. The primary goals, he stresses, are control of weeds and reduced costs—which means eliminating some mowing.

Heavy rates, three-fourth to one ounce per acre, caused some phytotoxicity which appeared as a yellowing of turf, says Ed Edwards, landscape supervisor at the Fort Wayne District of the Department of Highways. This experience was on some plots tested in cooperation with Purdue University.

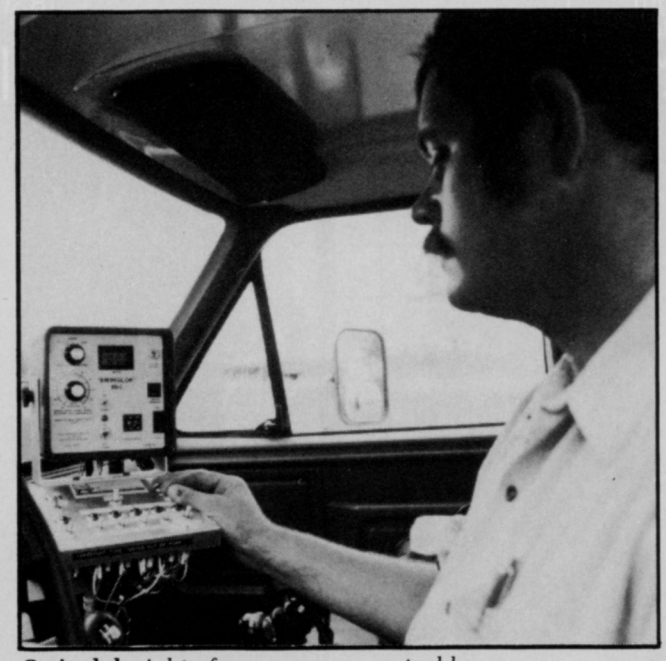
"Our key goal was to kill wild carrot without damage to grass which we have been able to do at the low, one-fourth to one-third rates," Edwards says.

Timing

Timing of spray is always a factor, regardless of the kind of spray combination being used.

Burkhardt says a late, wet spring can upset timing, and is especially critical where contact work is involved. A late spring, he has found, can delay leafing of brush and germination of annual weeds, thus reducing control.

Telar has proven compatible in tank mixtures with most other non-crop chemicals. Even so, the company strongly recommends that small quantities be tested for compatibility before mixing field scale tank mixes. At Indiana, Telar mixed well with Embark. Not only is Telar compatible, Burkhardt believes it may even have some synergistic effect, although he points out that this is not documented.



Swinglok *right-of-way sprayer control box.*

Timing of spray is always a factor, regardless of the kind of spray combination being used.

Embark is used at the pint per acre rate with Telar at one-fourth ounce per acre—plus one-half gallon 2,4-D amine and one-fourth percent nonionic surfactant to the area to be treated.

Indiana is using the new Swinglok right-of-way sprayer. Telar is mixed as a slurry in water and dumped into a 50-gallon side tank with the other chemicals. Total spray volume mix is 25 to 40 gallons per acre.

Major acreage for weed control is handled by private contract. However, the department is budgeted for spot work—primarily for brush, thistle and Johnsongrass control.

With good weed control Burkhardt says the public does not object to greater turf height. Typically, the program is to mow the full median and 18 inches to 20 inches on each side on the interstates—plus full widths on cycle 2.

Burkhardt says this is true for the entire state. "We operate the entire system on a single plan—not by district," he says, "and this is a strong advantage." Allowances are made for local situations within the statewide plan.

The Indiana Department of Maintenance staff believes that a long-time testing program is now paying big div-idends for the state. "Our test work and evaluation which began in the early 1970s now points to a workable mixture of chemicals. These provide acceptable results and may even help us reduce both chemical spray use and mowing," Burkhardt says.

The evaluation will continue even as the new program is implemented.

Telar promises to be basic in Indiana highway weed control. The new product, labeled in 1983, can be used both for selective and non-selective weed control. Bluegrass, fescue and smooth brome all show good tolerance at the lower rates.

The same is true for bahiagrass and bermudagrass in southern areas where these grasses are common. At higher rates, non-selective weed control is feasible. A surfactant in all postemergence applications enhances activity and is recommended.

Telar inhibits weed growth very quickly after treatment. However, dying weeds may not be noticeable for one to three weeks following spraying.

"This is acceptable. We know that if we can get timely application, we'll have good weed control," he says. **WT&T**

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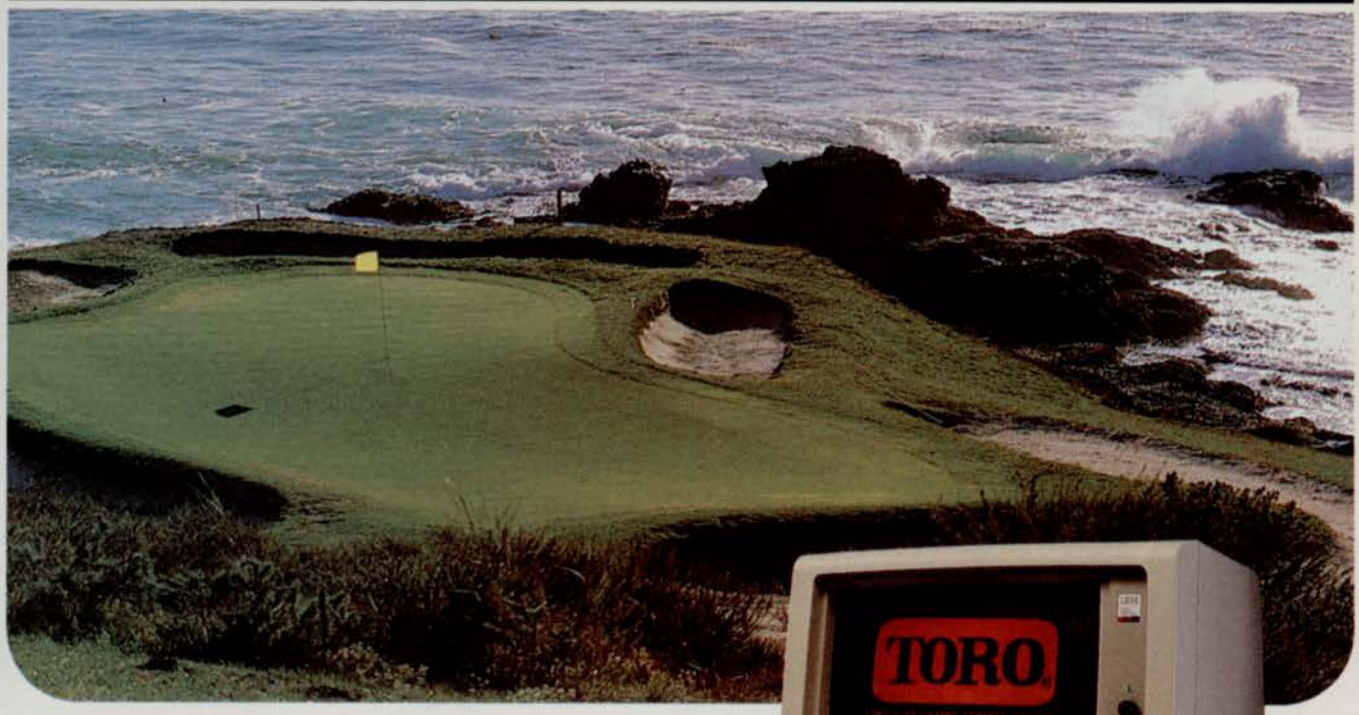

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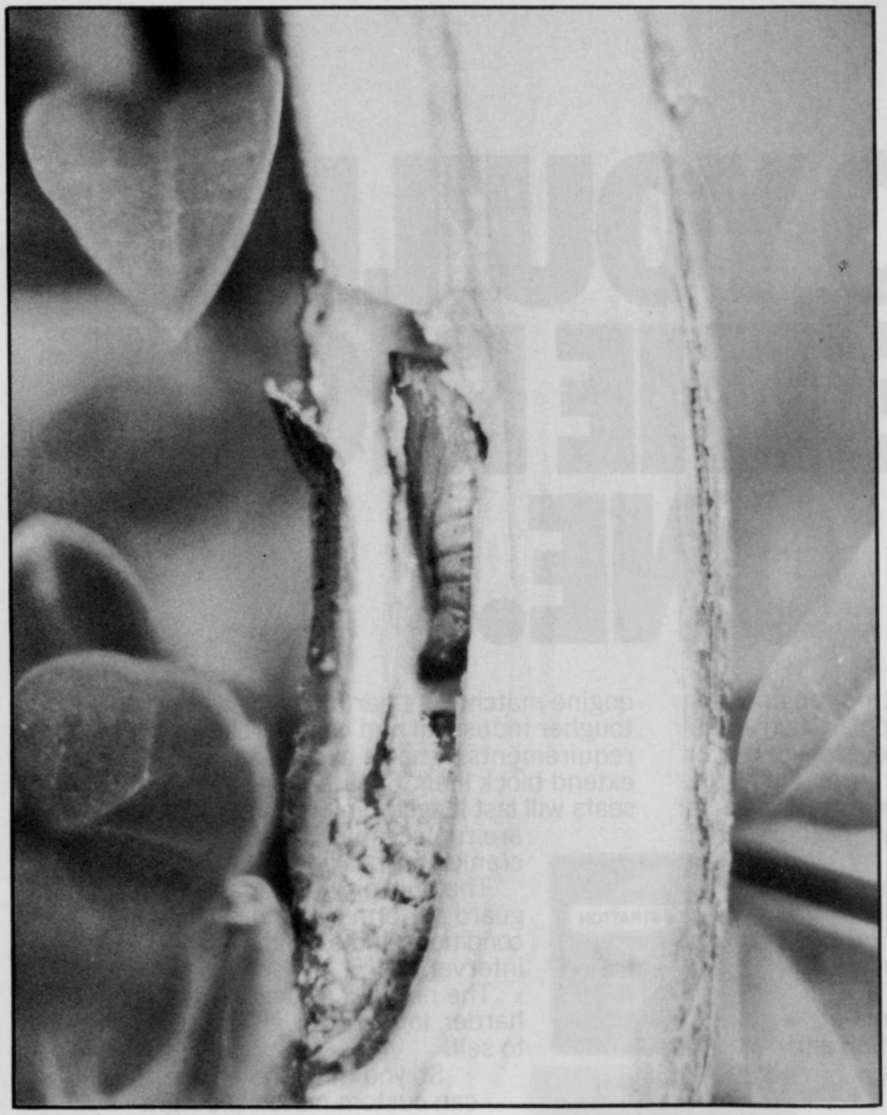

A lilac borer *pupa.*

The Hidden Enemy

Often doing most of their damage undetected, borers are distructive plant pests. Knowing the early signs and symptoms of borer infestation can help save many trees and shrubs.

by David G. Nielsen, Ph.D

Insects that bore beneath cortical tissues of their host constitute one of the most damaging groups of plant pests.

Although damage symptoms eventually become obvious, a borer's activity is often undetected until after significant damage has been done to the tree or shrub. Borers are unique in that they directly destroy vascular tissues and structural integrity while operating beneath bark in a secluded and protected environment.

Their feeding location complicates efforts to control them. The subcortical environment inhabited by borers is an apparent haven, but must be a hostile challenge to colonization.

The larva is small when it invades this center of plant activity, and internal vascular pressures force many larvae to retreat and perhaps die. Toxic chemicals in these tissues may repel or kill larvae. These factors have limited exploitation of sub-cortical tissues of healthy trees by insects. However, protection offered by tree bark must be a powerful evolutionary incentive for colonization by these prolific and adaptive animals.

Boring insects thought to be primary invaders, capable of reproducing in so-called healthy trees, are far outnumbered by those considered to be secondary, capable of reproducing only in weakened trees. If healthy trees are not susceptible to primary borer attack, then trees harboring larvae must be stressed or in an altered state of vitality. This fact should always be kept in mind when designing a borer control program, or a tree management program designed to reduce insect problems. This topic will be covered later in this article.

Two very different kinds of insect borers will be discussed to present principles associated with controlling the most common and important kinds of borers that attack landscape trees. Much of the information presented can be extrapolated to other kinds of borers.

Clearwing moth borers

Clearwing moths (see table for important species) in the order *Lepidoptera* and Family Sesiidae comprise one of the most homogeneous groups of insects known.

In other words, they are more alike, as a group, than are most other families of insects. This fact is important for us to know when defining re-

Dr. David G. Nielsen is professor and project leader in the Department of Entomology, The Ohio State University, The Ohio Agricultural Research and Development Center, Wooster, OH.

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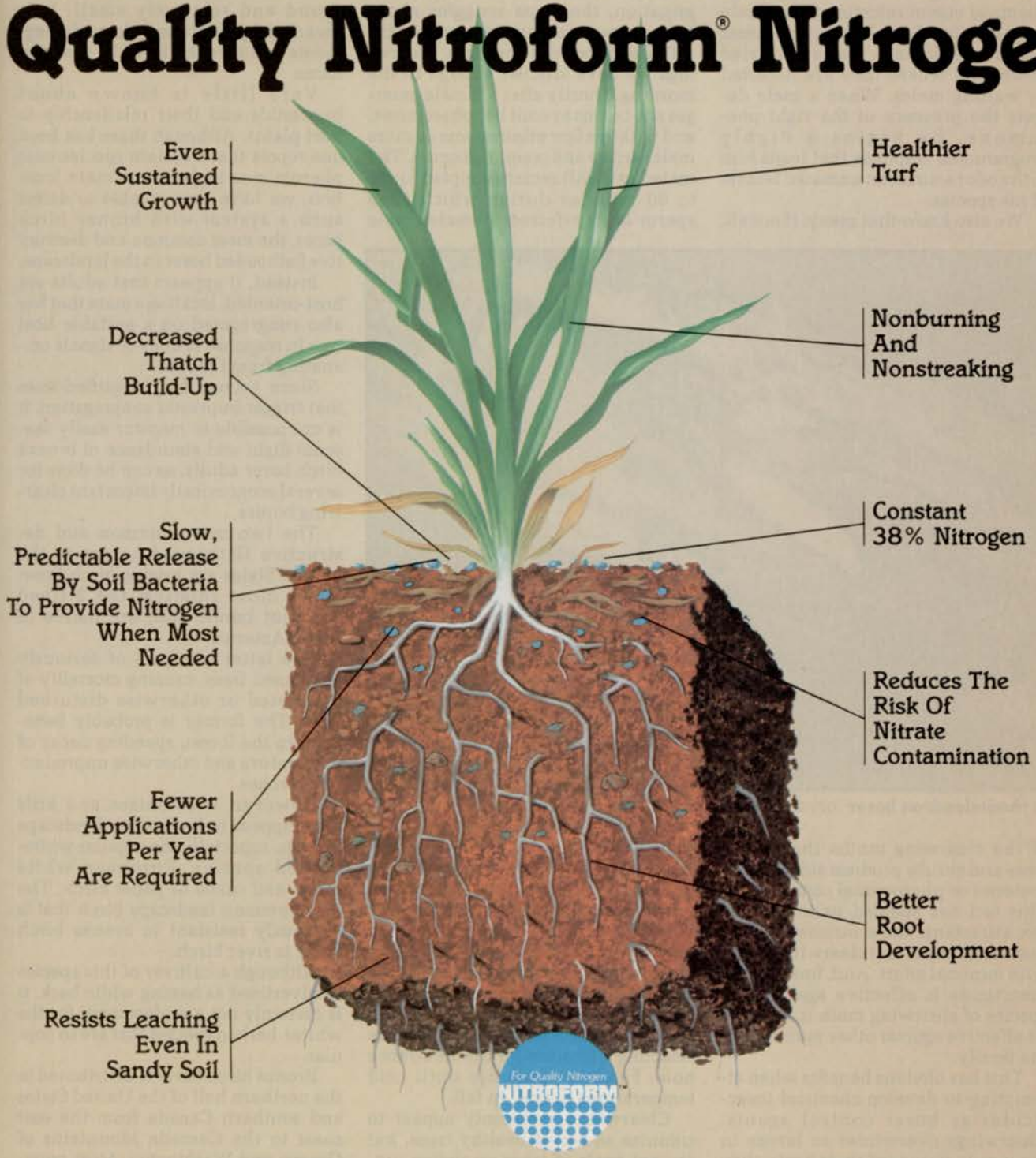
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search protocols and formulating control strategies.

For example, we have learned that all clearwing moths use long-range chemical communication to facilitate mate location. Females emit perfumes called pheromones that are carried downwind where they are detected by waiting males. When a male detects the presence of the right pheromone, he begins a highly programmed response that leads him to the odor source, an unmated female of his species.

We also know that many, if not all, of the clearwing moths that attack trees and shrubs produce similar pheromones or pheromonal components. This fact has enabled us to develop sex attractants for a number of economically important clearwing borers with minimal effort. And, finally, if an insecticide is effective against one species of clearwing moth it will also be effective against other members of the family.

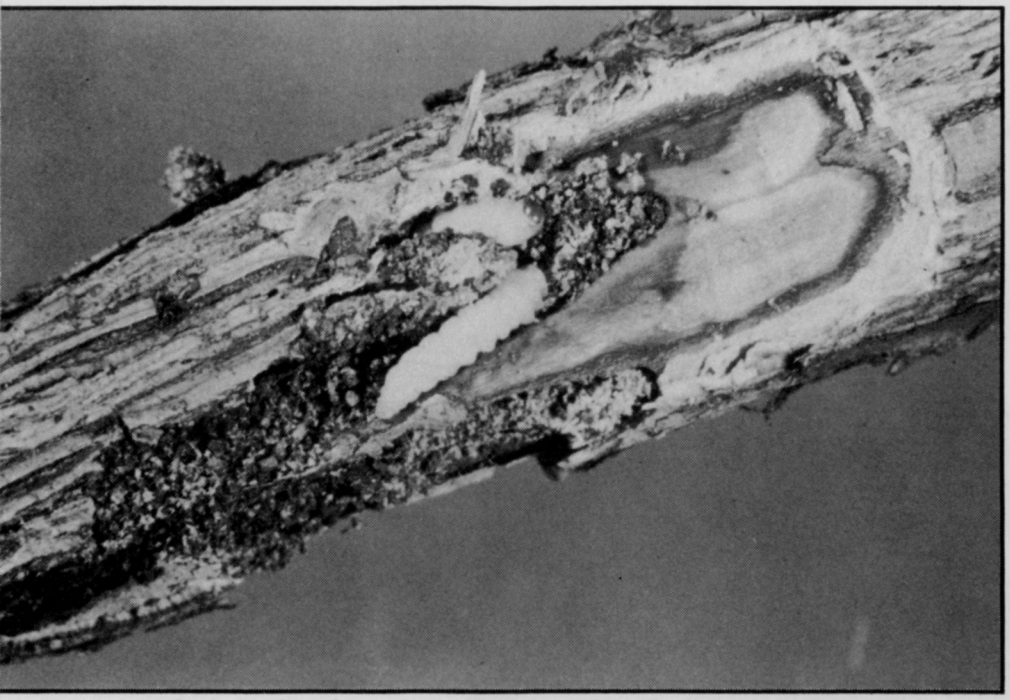
This has obvious benefits when attempting to develop chemical insecticides as borer control agents. Clearwings overwinter as larvae in the woody tissues of their hosts; they are relatively host specific.

For example, lilac borer may inhabit lilac, ash, and privet, but not oaks, maples, pines, etc. The most common scenario for clearwings in trees and shrubs is to complete one developmental cycle or generation each year. After overwintering successfully, the larva either resumes feeding to complete development or becomes a pupa, the transitional stage between the damaging larval stage and the adult.

Approximately 10-14 days after pupation, the pupa wriggles about half way out of the tree, the pupal skin splits, and the adult emerges. Clearwings we have studied emerge in the morning. Shortly after a female emerges she begins to emit her pheromone, and within a few minutes one or more males arrive and coupling occurs. The mated pair will remain coupled for 60 to 90 minutes during which time sperm is transferred. Females mate only once; males will mate several times.

Soon after the pair separates, the female begins laying eggs on the tree where she mated. If disturbed, she may fly to another area resulting in oviposition on a nearby host tree. Eggs are laid singly and require 10-14 days to hatch. Larvae hatch and crawl over the bark surface for some time before selecting a location for their entrance hole. Feeding continues until cold temperatures prevail in fall.

Clearwings commonly appear to colonize so-called healthy trees, but are not pests of trees on native, undisturbed sites. So, they are probably secondary pests, but appear to be infesting otherwise healthy trees.



A rhododendron borer *larvae is shown above with resulting larval damage.*

Metallic wood borers

Metallic wood borers (see table for important species) in the order *Coleoptra* and family *Buprestidae* are some of the most beautifully irridescent organisms on earth, but their larvae, known by the misnomer flatheaded borers, are destructive pests of landscape trees.

Actually, the head of the larva is round and relatively small. It is dwarfed by flattened thoracic segments that give the larva its common name.

Very little is known about buprestids and their relationship to host plants. Although there has been one report that a certain species uses pheromones to facilitate mate location, we have been unable to detect such a system with bronze birch borer, the most common and destructive flatheaded borer in the landscape.

Instead, it appears that adults are host-oriented, locating a mate that has also congregated on a suitable host tree in response to cues or signals emanating from the tree.

Since no one has identified cues that trigger buprestid congregation, it is not possible to monitor easily seasonal flight and abundance of bronze birch borer adults, as can be done for several economically important clearwing borers.

The two most common and destructive flatheaded borers in the United States are bronze birch borer and a close relative, the 2-lined chestnut borer. Both are native to North America.

The latter is a pest of seriously weakened trees, causing mortality of defoliated or otherwise disturbed oaks. The former is probably beneficial in the forest, speeding decay of overmature and otherwise unproductive birches.

However, it colonizes and kills what appear to be healthy landscape birches, especially the popular white-barked species, European white birch, and canoe or paper birch. The only common landscape birch that is obviously resistant to bronze birch borer is river birch.

Although a cultivar of this species is advertised as having white bark, it is certainly not a replacement for the whiter-barked species that are so popular.

Bronze birch borer is distributed in the northern half of the United States and southern Canada from the east coast to the Cascade Mountains of Oregon and Washington. Most populations complete one generation each year; throughout its range larvae overwinter.

If the larva is in a part of the tree with thick bark it may overwinter in the phloem or inner bark. Otherwise, larvae construct an overwintering chamber within xylem (wood).

In any case, it appears that larvae

continued on page 54

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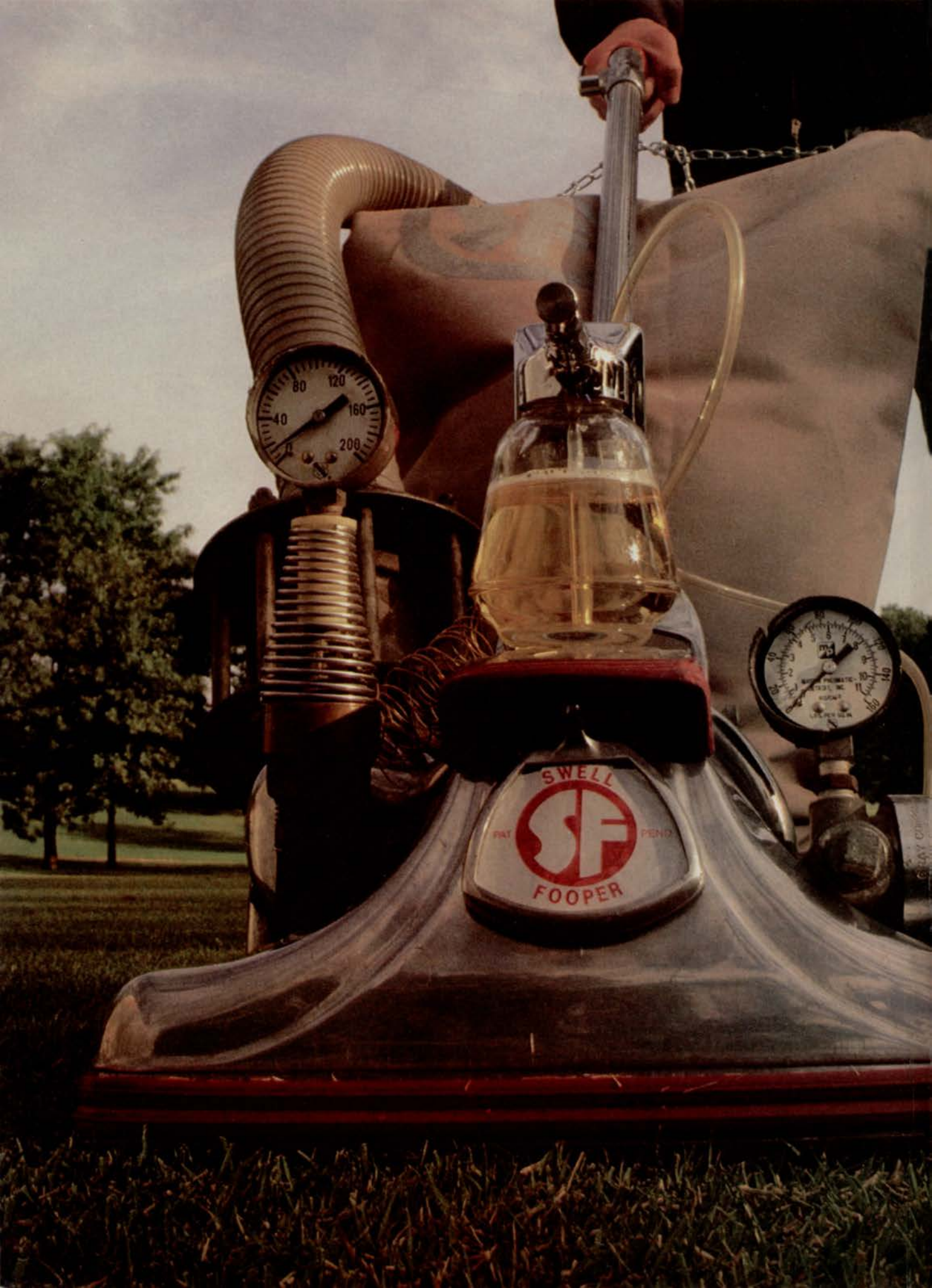
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BORERS *from page 50*

construct a frass-packed tunnel from the chamber to the outer bark cortex before overwintering. This larval channel undoubtedly expedites and facilitates emergence by the adult the following spring.

Larvae pupate in May or June. Ten to 14 days later, the adult chews a D-shaped emergence hole that conforms to the shape of the thorax before emerging. If the hole is not shaped properly before the beetle tries to climb free, it may become permanently stuck in the hole.

Most adults emerge during a 4 to 6 week period in late spring and early summer and must feed at least 8 to 10 days before they are capable of laying eggs. Females are apparently discriminating egg layers because each produces only 10 to 40 eggs during a 3 to 6-week life time.

Eggs are glued to bark surfaces, usually near the v-shaped, black areas at the junction of branches with limbs or limbs with the trunk. Larvae hatch by chewing through the egg chorion at its point of attachment to the bark after a 1 to 2 week incubation period.

Larvae feed initially in the cambial zone, stimulating some trees to form a callus-like tissue that shows-up as ridges in the bark. Since larvae feed horizontally and switch directions at acute angles, the raised areas on the bark are in a zigzag pattern.

Other researchers have hypothesized that this feeding pattern minimizes vascular pressures on larvae, improving their chances of surviving the tree's natural resistance.

The primary symptom of bronze birch borer attack is dieback of the uppermost branches of the tree. When this is noticed, the bark should be inspected for the presence of narrow, raised areas in an S-shaped configuration.

If this symptom is present on birches with top-dieback, you can be certain that bronze birch borer is the culprit. If D-shaped emergence holes are detected, you know that the infestation must be dealt with immediately if there is any hope of saving the tree.

Control strategies

There are four factors that are of primary importance in developing a borer control strategy:

1 maintaining plant vitality,
2 knowing when adults begin emerging and for how long emergence continues,
3 knowing which labeled insecticides are most effective, and
4 achieving thorough coverage of all bark and leaf surfaces.

Maintaining plant vitality

Many people do not realize that the urban forest is a hostile environment for woody plants. Soil texture, grade, and chemistry have often been dramatically altered by activities of urbanization, and exotic trees are planted in locations for which they are not adapted.

Landscape architects and others who choose trees for specific sites should do a better job of selecting trees that can be expected to thrive, or at least survive, in the area where they will be planted.

Very little is known about buprestids and their relationship to host plants.

Whenever possible, sites should be altered to meet the requirements of the tree to reduce long-term maintenance costs associated with weakened trees.

Recognizing that borers are opportunists that exploit weakened trees, it should be obvious that anything we can do to improve tree vitality will reduce borer infestation and damage.

The following cultural practices will improve or help maintain tree vitality, helping the tree to help itself in its battles with borers and perhaps other insects and diseases.

Pruning

Landscape trees should be pruned properly and on a timely basis following recommendations recently published by Dr. Alex Shigo of the Northeast Forest Experiment Station in Durham, NH.

Trees like birch should be pruned after August 1 to minimize bleeding and problems with canker-causing fungi. Proper pruning will improve both the confirmation of the canopy and the energy economy of the tree, leading to improved vitality.

Fertilization

In native habitats (i.e., forests there is a cycling of nutrients as leaves and branches are shed, fall to the ground, and decompose. The same process occurs with understory plants, including shrubs, forbs, and grasses, resulting in a continuous supply of nutrients.

This cycling does not occur in much of the urban forest because leaves and other refuse are discarded annually. Competition by dense plantings of grasses further depletes soil nutrients. Consequently, urban trees will benefit from fertilization.

An inorganic, slow-release fertilizer should be used in fall after one or two hard frosts. It can be broadcast on the soil surface, injected under pressure, or placed in drill-holes. If annual fertilization is practiced, 4 pounds of actual N per 1000 square feet should be used. I recommend 6 pounds of N per 1000 square feet every other year.

Top-dressing may be the most cost-effective method, but aerification supplied by injection or drill-holes may provide additional benefits.

Mulching

Bark damaged by maintenance equipment commonly serves as an oviposition site for borers.

Whenever possible, trees that are known to be hosts of clearwing borers should be mulched so that equipment does not need to be used close to the tree trunk. Of course, mulching also reduces evaporation of water from the soil, minimizes rapid changes in soil temperature, and reduces weed competition.

Mulch should not be more than about two inches in depth to minimize chances of creating an environment at the base of the trunk where microorganisms may flourish and eventually invade the tree.

Watering

There is a common misconception that large trees have deep roots, so they are not impacted by drought.

The reality is that large trees often suffer more from periods of low rainfall than smaller trees. In any case, trees will benefit from weekly watering whenever summer or fall drought occurs. Watering should be done slowly so that it percolates to the roots rather than running-off to areas that will not benefit the target tree.

This is one tactic in which the client can participate, if they are willing.

Debilitating insects

Defoliators and sucking insects should not be allowed to reach levels that debilitate trees, thereby reducing their natural resistance to opportunistic pests like borers. A high degree of control is not necessary because low levels of pests usually do not reduce tree vitality significantly. Consequently, insecticidal soaps, horticultural spray oils, and bacterial insecticides can be used to minimize reliance on conventional insecticides.

Implementation of a tree care program that includes the above prac-

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tices will lead to a more vital urban forest and a reduction in insect pest problems. But, there will always be times when a borer infestation must be dealt with aggressively to save the tree.

Defining adult emergence

Detection of presence and delineation of the emergence period for several clearwing moth borers can be accomplished with pheromone traps. Conrel Clearwing Borer Traps (available from Conrel, 110 A St., Needham Heights, MA 02194) can be used to capture male moths of the following borers: banded ash clearwing (looks much like lilac borer but emerges in August and September rather than May and June), dogwood borer, lilac borer, lesser peachtree borer, peachtree borer, an oak borer, and rhododendron borer.

The traps are simply placed in a convenient location in your service area and checked periodically beginning about two weeks before emergence of the target borer species is expected. Directions provided in the trap kits and color photographs make the traps useful even to practitioners who are unfamiliar with insects.

Borer sprays are applied at specified time intervals after the first male moth is captured.

In most cases, clearwings that attack trees can be controlled with a single application of an effective insecticide, if it is timed properly.

We have been unable to detect the presence of long-range sex attraction with bronze birch borer, so monitoring adult emergence is laborious, requiring daily or weekly inspection of infested trees or bolts.

Recently, we have described a way to predict bronze birch borer emergence based on local temperature. Degree-Day (°D) insect activity models are based on a threshold temperature and a starting date (the date on which you begin accumulating °D above the developmental threshold).

Careful analysis of several threshold temperatures and starting dates in Columbus and Wooster, OH, indicate that these values must be prescribed for a given geographical area.

For example, in Wooster which is about 50 miles south of Lake Erie, the best threshold temperature for predicting 10 percent adult emergence was 10°C (50°F) with a starting date of April 1. In Columbus which is latitudinally about 50 miles south of Wooster, the best threshold temperature was 8°C (46°F) with a starting date of May 1.

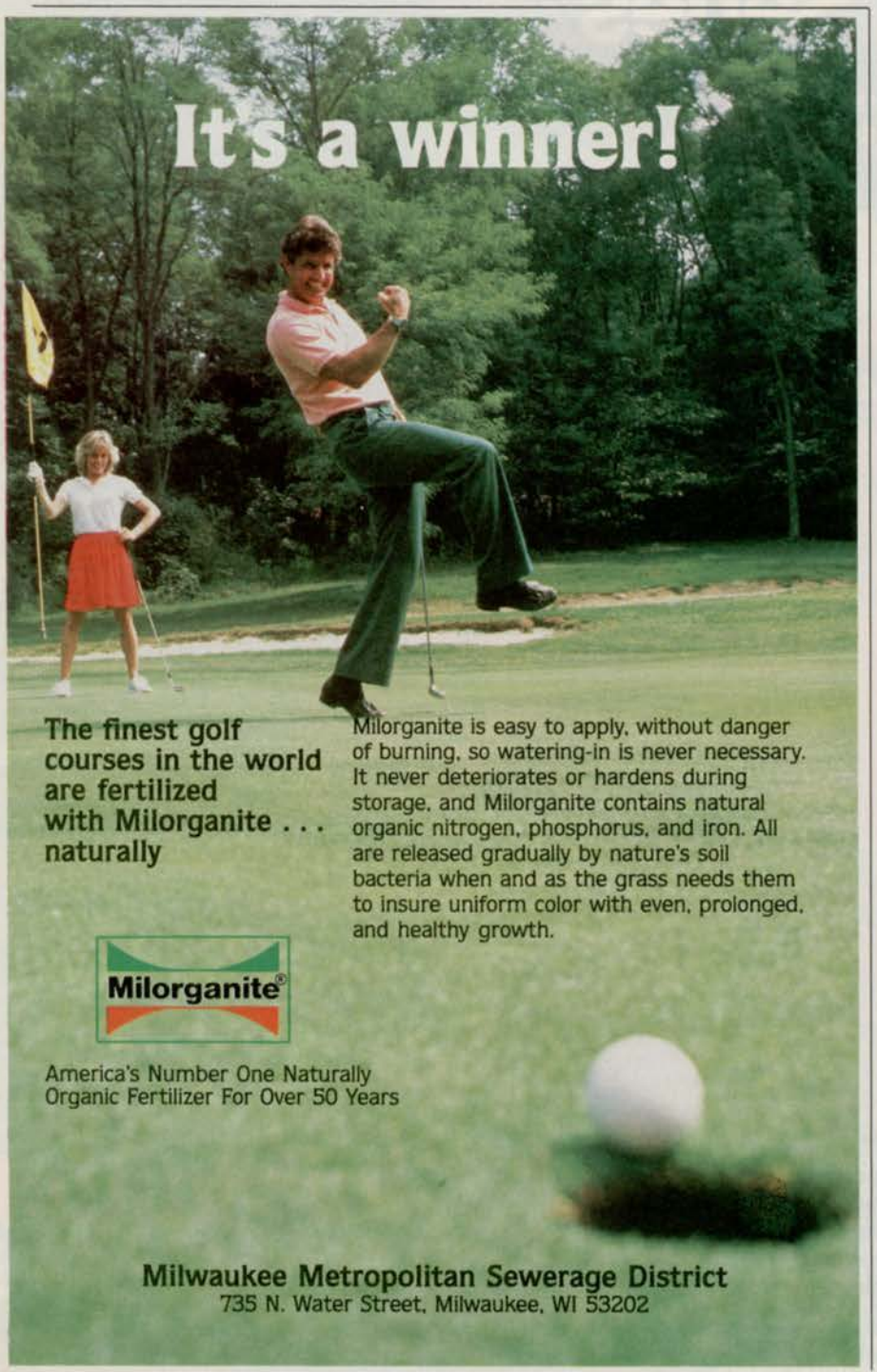
We don't know how well these models will fit other locations. Someone in each area of the country who wishes to develop this kind of model for predicting bronze borer emergence will need to collect infested wood in early spring, record seasonal emergence and temperature, and then work with a statistician to determine if one of our models accurately describes birch borer emergence in their area.

The importance of using a predictive model based on local temperature is that a borer population may emerge as much as two to three weeks earlier or later than usual during a particular year. This accelerated or delayed emergence is directly related to temperature and will directly influence the success of your borer control program.

Effectiveness of available insecticides

Dursban (chlorpyrifos), Turcam and Dycarb (bendiocarb), lindane, and Thiodan (endosulfan) are registered for use against borers. I have not worked extensively with Thiodan but believe the other materials to be at

continued on page 60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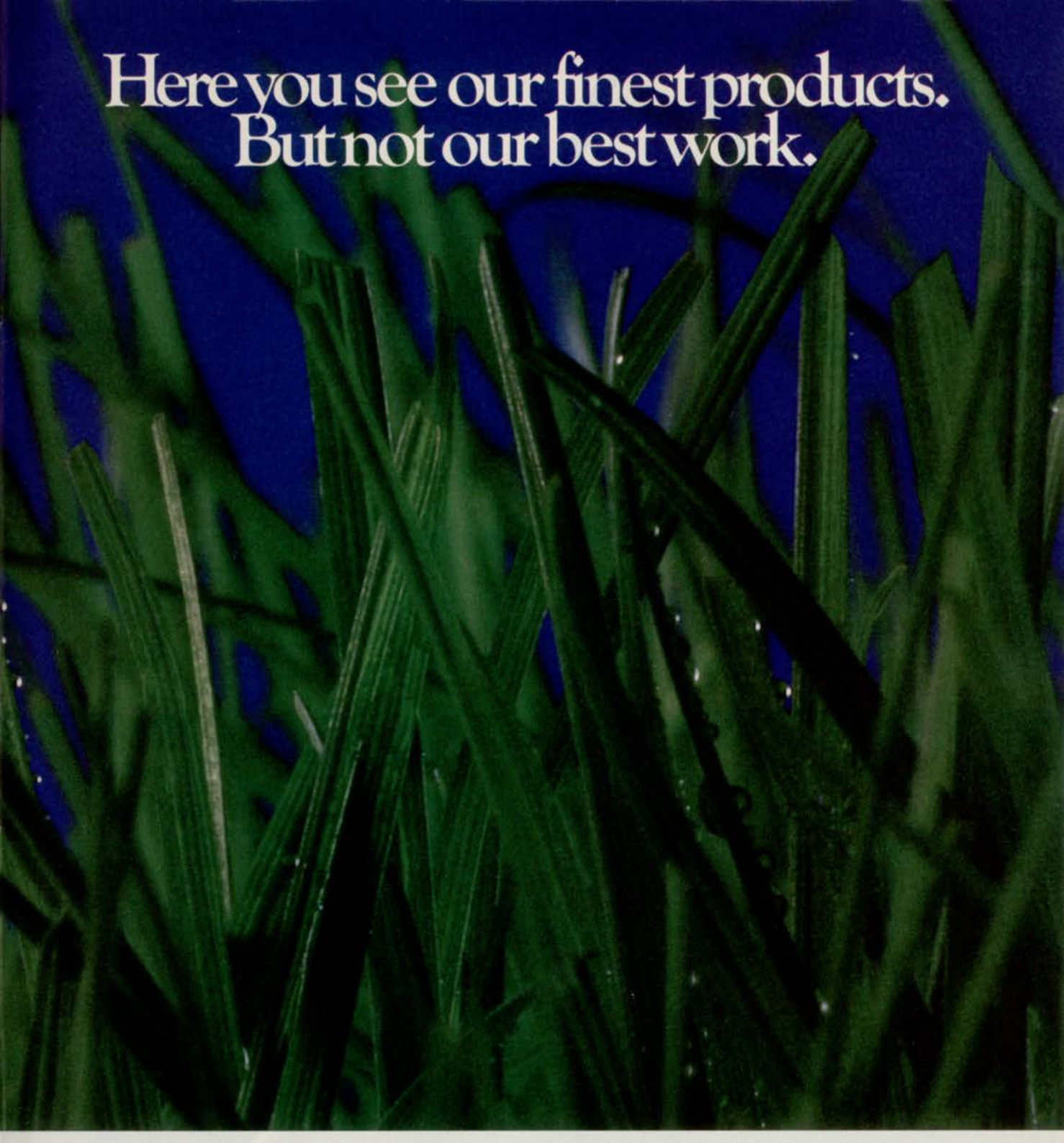

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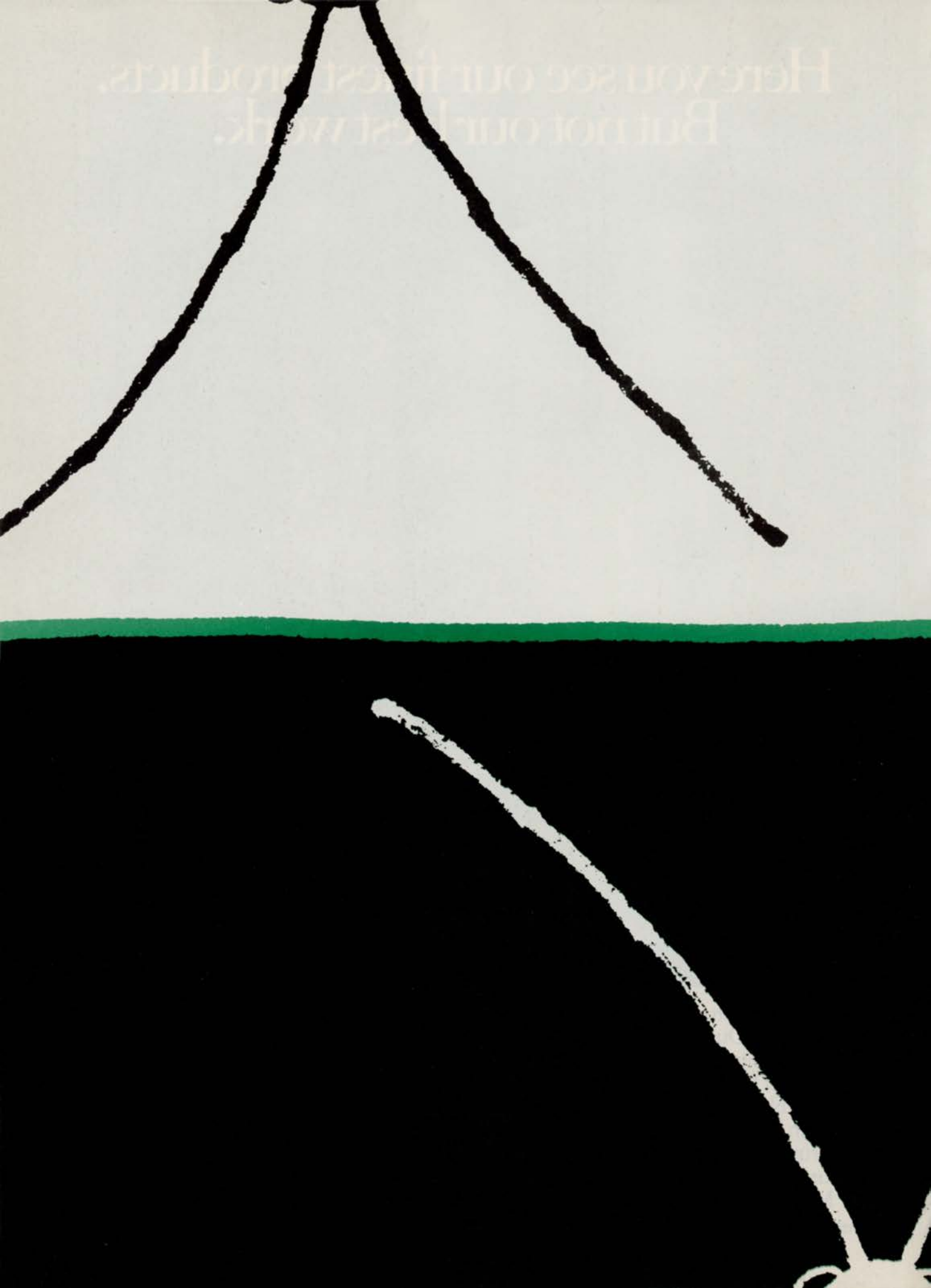

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BORERS *from page 56*

least as effective or better.

Chlorpyrifos is available in three formulations (Dursban 2E, 4E, 50WP) and is registered for use against all borers on all trees and shrubs. The usage rate is commonly one pound of active ingredient per 100 gallons of water applied to runoff. Currently, Dursban is the best choice for controlling clearwing borers. In my experience, a single application of Dursban, 10 to 14 days after first adult emergence as monitored by a pheromone trap, will provide season-long protection.

The exception would be lesser peachtree borer that emerges from May through September in much of its range. Two or three applications at 5-week intervals may be required to control this species. Lindane is somewhat hard to find these days but is an effective borer control product with an excellent safety record.

The most commonly used formulation is the 20 percemt liquid that contains 1.8 pounds of insecticide per gallon. It can be substituted for Dursban at the one pound of active ingredient per 100 gallons of water usage rate for controlling clearwing borers. To my knowledge, products containing bendiocarb have not been evaluated against clearwing moths. We plan to do this in the near future.

Turcam 76WP (or Dycarb) is my choice for controlling bronze birch borer, although Dursban has also provided excellent control. Again, the one pound active ingredient usage rate applies. The initial thorough-coverage spray should be applied just prior to first adult emergence.

In northeastern Ohio this is usually in late May (20-25). Two repeat applications are made at two-week intervals. The spraying should be initially focused on bark of the trunk and all branches, even in the top of the tree, but leaves should also be sprayed because adults must feed for at least several days before laying eggs.

By spraying before adults begin emerging, repeating the application throughout the major emergence period, and covering both bark and leaves thoroughly we:

1 kill adults as they construct their exit hole,

2 perhaps kill eggs or larvae when they eat sprayed bark while chewing through the egg chorion at its point of attachment to the bark, and

3 kill adults when they contact bark or consume or contact treated foliage.

When spraying trees to control clearwing borers, application can be delayed until after oviposition, because larvae hatch and then crawl over the bark surface before choosing an entrance site.

However, with flatheaded borers, the spray must be applied before oviposition, since larvae construct their entrance hole at the point on the bark where the egg is attached. Any borer control strategy should be coordinated with a tree health care program, including removal and destruction of borer infested wood for top-killed and dead trees, and cultural practices that have already been enumerated.

Borer control procedures have now been developed that can be used by arborists and other landscape managers to minimize damage done by borers, some of the most damaging insect pests in the urban forest. **WT&T**

The author encourages all applicators of insecticides to read the container label carefully, following all instructions. Recommendations provided in this article are based on experience by the author. The author wishes to thank Rodney C. Akers for providing information on D models for predicting emergence of bronze birch borer adults.

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Circle No. 150 on Reader Inquiry Card

Diseases of Northern Turf

by **J.M. Vargas**, turfgrass pathologist, Michigan State University

New findings and changing attitudes have improved turf disease control over the last few years.

Researchers are discovering more about the actual disease-causing organisms. In a few cases, researchers have discovered a combination of pathogens is involved in causing a particular disease. As a result, a combination of fungicides is needed to achieve control. Fungicides are being directed more effectively at the pathogens.

At the same time, new findings about the effects of certain cultural practices on certain turf varieties are providing clues to disease management. For example, safe mowing heights and fertilization rates are different for different varieties of grass.

Definite progress is being made in turf disease management. All turf managers should reevaluate their disease control programs to consider all new information and all new products available.

Dollar spot

Dollar spot is found primarily on golf course grasses, such as creeping bentgrass and annual bluegrass, when the temperature is between 60-85 degrees F.

Two fungi cause the symptoms of the disease on turf, *Lanzia* spp. and *Moellerodiscus* spp. Both fungi appear to be managed by the same large selection of fungicides, although one has to wonder if resistance to some fungicides might not be due to the differential sensitivity of the two fungi. (See Table 1)

What is needed is an easy, reliable method to distinguish between these

Pythium blight *rapidly strikes ryegrasses and other turfs where drainage is poor in hot and humid weather. Recovery is slow since pythium usually kills the entire plant.*

two fungi in the field.

Fortunately, dollar spot caused by both fungi appears to be reduced by adequate nitrogen and soil moisture levels.

Brown patch

Brown patch occurs under hot, humid conditions, primarily on golf courses. The disease is also infecting home lawns containing some of the new improved perennial ryegrasses.

It can be culturally managed by reducing the nitrogen applied just prior to the advent of warm weather and increasing air circulation over turf areas. A fairly large choice of fungicides is available for control of Brown patch.

Pythium blight

Pythium blight is also found on golf courses and home lawns containing perennial ryegrasses. The seriousness of the disease is greater than some turf diseases since Pythium blight usually kills the entire plant, not just foliage.

Pythium causes rapid loss of turf in hot, humid weather. Recovery of infected areas is slow since regrowth must come from stolons and rhizomes of nearby healthy plants. Annual bluegrass or broadleaf weeds often move in before healthy turf spreads into the damaged area.

Cultural management of Pythium blight consists of reduced nitrogen levels just prior to the advent of warm weather and improving drainage.

A combination of systemic fungicide followed by a contact fungicide is recommended for control of Pythium blight.

The systemic fungicides include metalaxyl (Subdue, Ridomil, Apron) and propamocarb hydrochloride (Banol). Check the label for the appropriate application rate for the specific kind of turf. Although the active ingredient may be the same, the concentration and the rate may vary.

Systemic fungicides will manage the disease for up to three weeks. Little spread of the disease occurs after the systemic fungicides are applied, although mycelium of the fungus may remain evident on the previously infected tissue for a couple of days.

No actual resistance to these two fungicides has been reported, but the possibility exists. It is wise therefore to follow each systemic fungicide application with an application of contact fungicide (chloroneb or ethazol) in case resistance develops. The contact fungicide will prevent the resistant strain of fungus from devastating the turf.

Anthracnose

Anthracnose is primarily a disease of annual bluegrass, although it will attack fine leaf fescues, perennial ryegrasses, and seaside creeping bentgrass. The fungus causing the disease is *Colletotrichum graminicola*.

Annual bluegrass dies from anthracnose during heat stress periods of the summer. This is not due to heat alone, as was once believed. If proper cultural management is followed, and effective fungicides are used, annual bluegrass will survive the summer heat stress period like any other perennial.

Good cultural practices consist of deep vertical mowing early in the spring, as soon as growth is initiated for the season. This will allow for production of new juvenile growth which should be more resistant to heat stress.

Vertical mowing should be followed by coring a week or two later for good root growth. A second coring should be made following heavy seedhead production in late spring to provide an optimum medium for maximum root growth in the remaining weeks prior to heat stress.

More than 70% of the roots of annual bluegrass disappear during heavy seedhead production. If only one coring a year can be made, this is the time to do it. A third coring should be made when the cool nights return in late summer and early fall.

Light nitrogen applications (½ lbs. actual N per 1,000 sq. ft.) should be made in June, July and August. This produces healthier annual bluegrass and reduces the amount of inoculum produced by *C. graminicola* for subsequent infection. Finally, one of the effective fungicides should be used to insure healthy turf.

Snow molds

There are two prevalent snow molds; pink snow mold (*Gerlachia patch*) and gray snow mold (*Typhula blight*).

Pink snow mold used to be known as Fusarium patch caused by *Fusarium nivale*. But the common name of the disease has been changed to **Gerlachia patch** and the scientific name of the causal organism has been changed to *Gerlachia nivalis*.

The disease becomes a problem in the fall when the temperature drops into the low 60's and continues through the spring until daytime temperature climbs back into the 70's. It is usually first noticed in the shaded areas of greens, tees, and fairways.

Gerlachia patch does not need snow cover to become active, only cool wet weather. Annual bluegrass is especially susceptible to Gerlachia patch.

In the spring, the disease is often misdiagnosed as copper spot, because of the small, copper-colored spot that it causes. However, copper spot is a disease that occurs in warmer weather.

Keeping nitrogen levels low when the disease is active may help manage this disease.

Gray snow mold only occurs under snow cover. It does not occur in the cool wet weather of fall and spring, except under leaf piles.

It is caused by two species of fungi depending on geographic location of the infection. *Typhula incarnata* is the primary species in the east, south, and parts of the west and midwest. *Typhula ishikariensis* is most prevalent in northern snow mold regions, especially where prolonged snow-cover exists (two or more months) in the midwest and western U.S.

The two species are easily distinguished from each other when observed soon after the snow melts. *T. incarnata* produces grayish spots in the turf, with a fairly large mass of brown filaments evident. *T. ishikariensis* spots have a reddish cast and contain small, dark black filaments.

Knowing the species is important in treatment of the disease. Many fungicides manage *Typhula incarnata*, but they do not all manage *Typhula ishikariensis*. The treatment picture is more complicated state by state. Check with local turfgrass experts to find out the fungicides that are effective for both species in your area.

Gaeumannomyces patch

Gaeumannomyces (take all) patch caused by *Gaeumannomyces graminis* var. *avanea* was formerly known as Ophiobolus patch caused by *Ophiobolus graminis*.

This disease was originally thought to be confined to the Pacific northwest, but it has since been reported on creeping bentgrass in the coastal areas of New England, New York, and the mid-Atlantic states.

Lowering the pH of the soil with

continued on page 66

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 from page 63

TABLE 1

Turf Disease and Controls*

Disease	Causal Agent	Hosts	Cultural Control	Chemical Control
Anthracnose	*Colletotrichum graminicola*	Annual bluegrass Fine-leaf fescue Kentucky bluegrass Perennial ryegrass	Adequate nitrogen. Cool grass by syringing	Maneb plus zinc sulfate, chlorothalonil, benomyl, thiophanate-methyl, thiophanate, thiophanate-methyl + mancozeb, tridimefon
Brown patch	*Rhizoctonia solani*	All major turfgrass species	Reduce nitrogen. Remove "dew." Increase air movement.	Mancozeb, maneb + zinc sulfate, chlorothalonil, anilazine, cycloheximide + thiram, benomyl, thiophanate-methyl, thiophanate, thiram, thiophanate-methyl + maneb, cadmium compounds, thiophanate + thiram, PCNB, iprodione, vinclozolin
Dollar spot	*Lanzia spp.* *Moellerodiscus spp.*	Annual bluegrass Bahiagrass Bermudagrass Centipedegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass St. Augustinegrass Zoysiagrass	Increase nitrogen. Remove "dew".	Benomyl, thiophanate, thiophanate-methyl, chlorothalonil, anilazine, cycloheximide + PCNB, cadmium compounds, thiophanate + thiram, thiram, thiabendazole, benomyl, iprodione, thiophanate-methyl + maneb, vinclozolin, triadimefon
Summer patch	*Phialophora graminicola*	Annual bluegrass Kentucky bluegrass Centipedegrass	Light, daily watering during the summer.	fenarimol, thiophanate-methyl, thiophanate, tridimefon, iprodione, benomyl
Helminthosporium Diseases	*(Dreschlera)*			
Brown blight	*D. siccans*	Ryegrass Bermudagrass Bentgrass, Fine-leaf fescue, Kentucky bluegrass	Remove clippings. Raise cutting height. Plant resistant cultivars. Moderate spring nitrogen. Daily irrigation	Mancozeb, chlorothalonil, cycloheximide, anilazine, maneb + zinc sulfate, cycloheximide + thiram, cycloheximide + PCNB, iprodione, vinclozolin
Leaf blotch	*D. cynodontis*			
Leaf spot	*D. sorokinianum*			
Melting-out	D. poae	Kentucky bluegrass		
Net-blotch	D. dictyoides	Fescue		
Red leaf spot	D. erythrospilum	Creeping bentgrass		
Stem and Crown Necrosis	D. speciferum	Bermudagrass		
Zonate eye spot	D. giganteum	Bermudagrass		
Gaeumannomyces patch (Take all patch)	*Gaeumannomyces graminis*	Creeping bentgrass Kentucky bluegrass Velvet bentgrass	Reduce soil pH. Avoid liming. Use acidic fertilizers. Sulfur.	None.
Pythium blight (cottony blight)	*Pythium* spp.		Improve soil drainage. Increase air circulation.	Chloroneb, ethazol, metalaxyl, propamocarb, hydrochloride
Red thread	*Laetisaria fusiformis*	Creeping bentgrass Colonial bentgrass Bermudagrass Annual bluegrass Perennial ryegrass Fine leaf fescues	Increase nitrogen	anilazine, iprodione, triadimefon, vinclozolin, chlorothalonil
The Snow Molds				
Typhala blight	*Typhula* spp.	Annual bluegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass Tall fescue Velvet bentgrass	Avoid early fall nitrogen fertility that leads to lush growth.	Mercury compounds, PCNB products, chlorothalonil, chloroneb. These products may have to be used in combination for effective snow mold management. Benomyl, Iprodione or Mancozeb will control *Gerlachia* patch where it occurs alone.
Gerlachia patch	*Gerlachia nivalis*			
Yellow patch	*Rhizoctonia cerealis*	Kentucky bluegrass Creeping bentgrass	Nitrogen to promote recovery.	Iprodione, fenaromil

*The order in which fungicides are presented does not imply the order of their effectiveness

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sulfur appears to be the best way to manage this disease. However, granular sulfur products have been observed to cause injury to the turf the season following application. This injury initially resembles dollar spot. Sprayable sulfurs are just as effective as granulars and do not have the negative side effects.

Summer patch

Formerly known as Fusarium blight, summer patch is caused by the fungus *Phialophora graminicola* and not *Fusarium roseum* and *F. tricinctum* as previously thought. This "frog-eye" disease is now called summer patch to avoid further confusion.

Summer patch is a warm weather disease occurring from late June through early September depending upon your location. The disease usually occurs after a week or two of dry weather following a heavy rain.

The characteristic initial symptom is wilted turf in the infected spot. This separates it from other diseases that have similar frog-eye symptoms.

Coring is recommended to improve root development, reduce thatch, and eliminate layering caused by two different soil types. Residential turf is often grown on poor soil.

Nutrient and water uptake are active processes which require adequate oxygen. Coring holes provide an excellent area for root growth with good aeration for proper uptake of nutrients and water.

Thatch reduction is best accomplished during the coring operation by breaking up the cores with a vertical mower or power rake. The core soil can be reincorporated into the thatch layer.

Power raking does little for thatch reduction. It removes leaf tissue which is readily broken down. Power raking does not remove the rhizomes and roots which are primarily responsible for thatch formation.

Layering results from soil of one type being placed on top of another type, as when a muck sod is placed on top of a mineral subsoil. Layering may not be a problem in the cool weather of spring and fall.

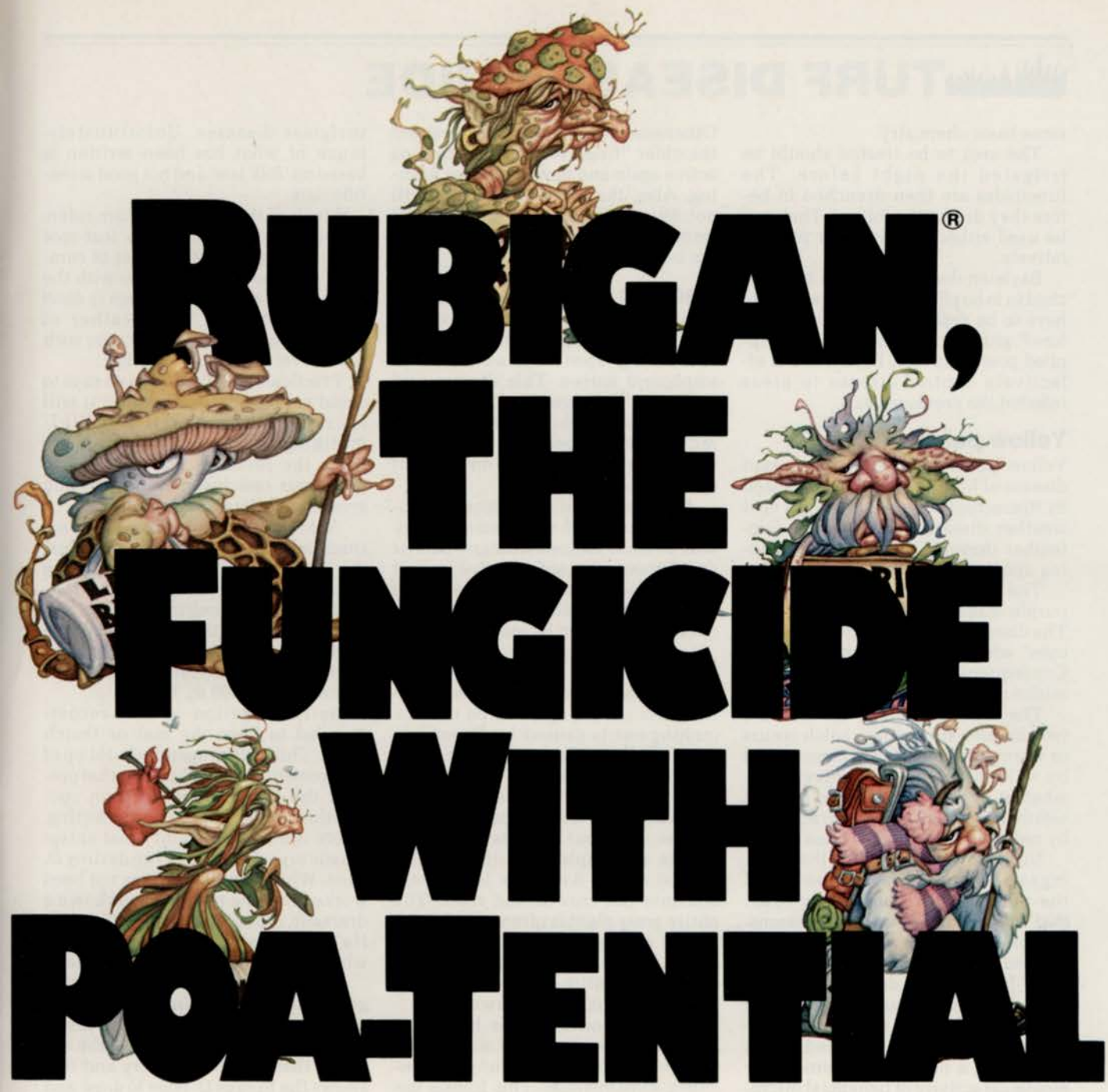
When summer conditions stress the turf, layering can be a serious problem. The entire root system is restricted to the upper layer, often no more than one inch in depth. Obviously, drought stress diseases like summer patch are going to be more severe under such conditions. Integrating the soil layers over a period of years through a coring program should create a deeper-rooted, healthier turf.

Nitrogen fertility in the summer months of June, July, and August will reduce the severity of summer patch. Approximately ½ lb. of actual nitrogen per 1,000 sq. ft. per month should be adequate.

Supplemental irrigation can culturally reduce summer patch if applied on a daily basis. Applied at midday, irrigation will cool the plants. It also provides water for the short and limited root systems of the infected plants.

If the thatch is kept moist, antagonistic microorganisms may develop, which will prevent the pathogenic fungi from attacking the plants. A daily irrigation program during the summer on infected turf may also cause the build-up of antagonistic microorganisms that destroy *P. graminicola*. Summer patch is effectively controlled by Cleary's 3336, Fungo 50, and Tersan 1991. They all have the

Pink snow mold, *or Gerlachia patch, used to be called Fusarium patch. It does not need snow cover to develop, only cool wet weather.*



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same basic chemistry.

The area to be treated should be irrigated the night before. The fungicides are then drenched in before they dry on the foliage. They can be used either curatively or preventatively.

Bayleton does not have to be drenched in to be effective. However, it does have to be applied preventatively, before *P. graminicola* becomes active. Applied preventatively, Bayleton will effectively control disease in areas infected the previous year.

Yellow patch

Yellow patch is a newly recognized disease of Kentucky bluegrass caused by *Rhizoctonia cerealis*. This is a cool weather disease that occurs in September through November, depending upon your location.

The initial symptoms are red to purple leaves on the infected plants. The disease is characterized by "frog-eyes" which resemble summer patch. Consequently, the disease is often misidentified as summer patch.

The main differences between the two diseases are summer patch occurs in warm weather and is characterized by wilting turf in the active spots, whereas yellow patch occurs in cool weather of the fall and is characterized by red blades on infected grass plants.

Nitrogen fertility during the growing season is necessary for recovery of the older yellow patch "frog-eyes" that were formed in previous seasons. The effect nitrogen has on the development of new yellow patch "frog-eyes" has not been determined.

Some manufacturers claim their products change the chemical and biological activity of the soil and thatch to make it a better environment for biological activity of beneficial microorganisms and healthier plant growth.

Several products were tested for their management of Rhizoctonia yellow patch. One such product called Lawn Keeper promoted excellent recovery of older yellow patch "frog-eyes" and prevented new ones from forming. It is important to point out these are only preliminary findings and further research is needed to check the reliability of these results and to determine rates, timing, and the exact effect the products are having on disease organisms.

Preliminary data suggest Chipco 26019 and Rubigan will manage *Rhizoctonia* yellow patch. Effective timing and minimal rates have to be determined. It appears nitrogen application will have to be made in conjunction with the fungicide. Otherwise, fungicides may prevent the older "frog-eyes" from becoming active again and new ones from forming. Also, the older "frog-eyes" will not fill in and the maximum benefit from the fungicides treatments will not be realized.

Necrotic ring spot

Another disease that occurs in the cool weather of spring and fall is necrotic ring spot caused by *Leptosphaeria korrae*. This disease also occurs as "frog-eyes" and, like yellow patch, plants in the active spots have red blades. It appears that yellow pathe and necrotic ring spot may be part of a disease complex.

Management of this disease is similar to yellow patch management. Laboratory results indicate Rubigan, Banner and Tersan 1991 are effective against *Leptosphaeria korrae*. Field work is needed before reliable fungicide recommendations can be made.

Melting-out

This disease is often incorrectly referred to as leaf spot. To be correct, melting-out is caused by *Dreschlera poae* (formerly known as *Helminthosporium vagans*) and is a disease of Kentucky bluegrass. It occurs in the cool, wet weather of spring. The disease starts out as spots on the leaf blades and rapidly (within 2 to 3 weeks) moves down the leaf sheath and into the crowns and roots. The entire grass plant is often killed or severely damaged during the period, which is where the term melting-out arises. The entire stand of Kentucky bluegrass seems to melt away.

Leaf spot, on the other hand, is a warm weather disease of many grass species caused by the fungus *Dreschlera sorokinianum*. This fungus has also been known as *Bipolaris sorokinianum* and *Helminthosporium sativum*).

There are many Kentucky bluegrass cultivars resistant to melting-out. Merion was the first recognized Kentucky bluegrass resistant to melting-out. Some of the newer Kentucky bluegrass cultivars have some resistance to melting-out, including Parade, Cheri, Baron, and Majestic. Still, stands of some of the newer Kentucky bluegrass cultivars may be thinned by melting-out in the spring, allowing for invasion of crabgrass, quackgrass, tall fescue and/or broadleaf weeds. This means cultural practices to reduce the severity of melting-out will have to be incorporated into turf management programs.

Helminthosporium melting-out is one of the oldest, most written about, turfgrass diseases. Unfortunately, much of what has been written is based on 'folk law' and not good scientific data.

Much of the older literature refers to melting-out as having a leaf-spot stage during the hot weather of summer. Anyone who is familiar with the disease knows all the damage is done during the cool, wet weather of spring. The turf begins to recover with the arrival of warmer weather.

Practically all the literature says to avoid spring nitrogen because it will increase the severity of Helminthosporium melting-out. It appears the research that lead to the erroneous conclusion was based on greenhouse data and not field.

At Michigan State University, data from the last four years suggests just the opposite. Nitrogen in the spring actually reduces the severity of Helminthosporium melting-out. We recommend two nitrogen applications during the spring period to help manage the disease, at a rate of ½ to 1 lb. of actual N per 1,000 sq. ft.

Daily irrigation is also recommended to keep the mat or thatch moist. This encourages the build up of antagonistic microorganisms that prevent the fungus *D. poae* from sporulating, or germinating, or infecting. There is also a possibility that antagonistic organisms may even destroy *D. poae*. While the details have not been worked out, the results have shown a dramatic reduction in the amount of Helminthosporium melting-out where light daily irrigation is applied.

The actual concept may be hard to grasp, since the disease occurs in cool wet weather. But, apparently just a few days without rain allows the top of the thatch to become dry and this allows the fungus *D. poae* to grow and infect grass plants. You aren't irrigating the turf, you are irrigating the thatch to keep it moist.

Following good cultural and biological practices will help improve the disease management obtained with fungicides. There are three excellent fungicides which will help manage Helminthosporium melting-out during the 3-4 weeks it is normally a problem in the spring; iprodione (Chipco 26019), vinclozolin (Vorlan), and chlorothalonil (Daconil).

There is a possibility that anilazine (Dyrene) may also manage the disease for the desired period of time, although more research is needed. Remember, applying these fungicides with a little nitrogen will make them more effective.

continued on page 74

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 from page 70

Dollar spot, *shown at left, damages bentgrass, annual and perennial bluegrass, bermudagrass and zoysiagrass. In the South it is common in the spring and fall. In the north it is active anytime temperatures are between 60 and 85 degrees.*

Brown patch, *at right, is the most common turf disease in the Southeast. It affects primarily St. Augustine and zoysiagrass in the South and bentgrass and perennial ryegrasses in the North. It is prevalent during warm, moist days with cool nights.*

Diseases of Southern Turf

by Don Blasingame, extension plant pathologist, Mississippi State University

Managers of southern turf not only fight diseases of six different warm season turf species, but also diseases of overseeded cool season turf species.

Although most of the diseases of southern turf are caused by fungi, other agents such as bacteria, viruses, and nematodes, can cause serious problems to certain grasses.

Turf managers in the South can't depend solely on fungicides for disease control. Good variety selection, proper fertilization, and appropriate cultural practices are very important in disease control. No amount of fungicide will compensate for poor fertility and cultural practices.

Brown patch

Brown patch is the most common turf disease occurring in the southeastern United States. Although St. Augustine and zoysiagrass are the most susceptible species, even the more tolerant centipede, bermudagrass and ryegrass are frequently damaged by this fungus.

Brown patch is favored by warm, moist weather combined with cool nighttime temperatures. Therefore, in certain areas of the South, brown patch can and does occur any month of the year.

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late April through mid-October.

Symptoms of brown patch on warm season grasses are different than the symptoms of the disease on cool season turf. Even though the grass is usually killed in a circular pattern, many times the smoke ring is not seen on southern turf. Also, under certain environmental conditions the fungus may cause a gradual thinning of the turf over a rather large area instead of killing in a circular pattern.

There are several factors that tend to make the grass more susceptible to brown patch. One is the excessive application of nitrogen fertilizer. The resulting lush growth is readily attacked.

Another is watering late in the afternoon and allowing the grass to remain wet for long periods of time. Excessive accumulation of thatch also creates a favorable environment for development of brown patch and many other diseases.

Fungicides are best used on a preventative schedule. Once symptoms develop control can be difficult.

Dollar spot

Dollar spot is common on many species of grasses, including bermudagrass, zoysiagrass, and annual and perennial bluegrasses.

Symptoms of dollar spot are different on certain warm season grasses than those noted on cool season grasses.

On the finer textured grasses, such as bermudagrass and zoysiagrass, the disease kills grass in small patches two to three inches in diameter. Under severe conditions, these patches may coalesce so that the turf has a mottled appearance. Blades of grass at the outer edges of the infected area develop tan spots with reddish brown margins.

On the coarser warm season grasses, the turf is killed in larger patches ranging up to a foot in diameter.

Dollar spot is prevalent during periods of mild weather during the spring and fall.

Unlike brown patch, dollar spot is retarded by high levels of nitrogen. Still, turf managers should consider the impact of high nitrogen on brown patch and other diseases.

Watering should be performed only in the early morning so the foliage can dry quickly. Fungicides can be used to help bring the disease under control once it gets established.

Leaf spots

There are a number of fungi that cause leaf spots on many southern grasses. Regardless of the causal agent, leaf spots and their control on southern grasses are similar.

Helminthosporium leaf spots (*Bipolaris* spp.)—Bermudagrass and ryegrass are most severely affected by helminthosporium infections, although the fungus can survive on centipedegrass and St. Augustine.

Infection can occur over a wide range of temperature, but usually is more severe at 70 to 95 degrees F. Milder temperatures in the spring and fall are more favorable for infection.

The excessive accumulation of thatch creates a favorable environment for development of brown patch and many other diseases that are caused by fungi.

Helminthosporium causes small, dark-colored spots or flecks on the leaves and sheaths. Leaf spots are usually more numerous near the collar of the leaf blades. Severely affected leaves wither and die and the turf frequently becomes brown and thin.

Symptoms on overseeded ryegrass are altogether different. Although leaf spots may occur, this same helminthosporium can cause severe crown rot. This causes a yellowing and discoloration of the grass and a general thinning of the turf.

Fertilize with adequate levels of nitrogen and potassium if helminthosporium diseases become a problem. With careful management, apply fungicides recommended for helminthosporium blight control.

Gray leaf spots—St. Augustine is the primary host for gray leaf spot. The disease occurs throughout the lower South during warm, humid weather.

Spots on the leaf blades are the most visible, but sheath and stem lesions also occur. Leaf spots begin as olive green to brown, water-soaked spots as small as a pin head. These enlarge rapidly and form a circular to elongate lesion that is brown to ash colored with purple margins.

The disease occurs during moderate to warm weather accompanied by high relative humidity. Severity of the disease is enhanced by applications of nitrogen fertilizer. It is more a problem in shaded areas where the grass remains wet from dew.

Treatment with a fungicide may become necessary if the disease outbreak is severe and accompanied by prolonged periods of wet favorable weather.

Rust

Rust or *Puccinia* species infect a number of grasses grown in the South, including ryegrass, zoysiagrass, bluegrass, fescue, bermudagrass, and St. Augustine. Zoysiagrass and bluegrass are the most often infected grasses.

Susceptibility depends on the variety. Fungus infection is favored by minimum and maximum temperatures of 50 to 70 degrees F. respectively. For this reason, the disease does not usually cause severe damage over an extended period. It is likely to be more severe in shaded areas during rainy, humid weather. Affected turf will appear unthrifty and begin to thin.

The disease is characterized by the presence of pustules on the leaf blades. These pustules range from bright orange to cinnamon-brown in color depending upon the species of fungus present.

Certain varieties of ryegrass are extremely susceptible to rust and sometimes severe damage can occur. Zoysiagrass, especially Meyer and Emerald, are most severely infected by rust.

Fertilize to stimulate grass growth, mow on a four to five day schedule, and catch clippings. If necessary, a fungicide may be applied to help reduce the amount of disease present.

Spring dead spot

Spring dead spot is a serious disease of bermudagrass in certain parts of the upper Sunbelt. It is found generally on bermudagrass or zoysiagrass under high maintenance.

Damage to the turf apparently occurs during the dormant season. When greenup occurs in the spring, there are areas a few inches to several feet in diameter where the sod is completely dead.

The causal agent for spring dead spot has not been identified. The only control procedures recommended are good cultural practices and limiting the use of nitrogen fertilizer, especially late in the growing season.

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fungicides can limit the damage. However, at the present time only two fungicides are labelled and these may be limited to use in certain states.

St. Augustine decline

St. Augustine decline (SAD) is caused by a virus. The symptoms are a mosaic type chlorosis of the leaf blades that resemble nutrient deficiency or mite feeding. Evidently there are several strains of the virus since there is a great range in damage to St. Augustine.

To this point, the disease has only been recorded in Arkansas, Texas, Louisiana, and Mississippi. There are no chemicals available for the control of SAD.

There are, however, several varieties of St. Augustine resistant to the virus. These can be planted in areas where the disease is a potential problem.

Floratam was the first variety release that has resistance to SAD. It is also resistant to chinch bugs. It has poor cold tolerance and should be used only in the lower South.

Seville is resistant to SAD and is more shade tolerant than common St. Augustine. Raleigh has both SAD resistance and good winter hardiness.

Downy mildew

Downy mildew of St. Augustine was first described on common St. Augustine in Texas in 1969. Since then the disease has spread and has been identified in Arkansas, Louisiana, and Mississippi.

Downy mildew appears as white, raised, linear streaks that develop parallel to the mid-veins of the leaf. Streaks appear in the spring and remain throughout the summer, giving the leaves a yellow appearance with some death toward the tips.

Severe disease occurs in grass grown in flood plains or poorly drained areas.

The white-streak symptom is easily confused with the virus disease, St. Augustine decline. However, the virus symptoms are more yellow in color and more mottled than striped.

Downy mildew has been difficult to control with most common turf fungicides. Good drainage is recommended for cultural control.

Pythium blight

Pythium blight can be a devastating disease on overseeded ryegrasses. Bermudagrass and other warm season grasses can be affected to a lesser degree.

An abundance of moisture is required for pythium blight development. In addition, the disease is favored by warm temperatures.

Affected grass is killed rapidly in spots two to four inches in diameter. These spots may develop into streaks so that large areas of turf are damaged.

During early stages of development, the affected grass appears wilted and greasy. At times the affected turf spots may have a cottony appearance due to the abundant growth of the fungus. For this reason, the disease is frequently referred to as cottony blight.

Certain species of pythium can also cause root rot on turfgrasses. Due to the restricted root function the plants become chlorotic and the turf begins to thin.

On overseeded grasses the disease can be limited by using treated seed and delaying the overseeding until as late as possible during the fall. Water as little as possible during perioids of favorable activity. The perennial

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Imidan 1E offers quick knockdown and good residual, cleaning trees of problems. But at the same time, Imidan is easier on beneficial insects than most other leading insecticides.

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TOUGH ON PESTS, EASY ON BENEFICIALS.

Circle No. 149 on Reader Inquiry Card

Turf Fungicide Directory

Common Name	Brand Name	Company	Circle No.
anilazine	Dymec 50	Gordon	201
	Dyrene	Mobay	202
	Ortho Dyrene	Ortho/Chevron	203
	Proturf Fung. III	Scotts	204
benomyl	Proturf Fung. DSB	Scotts	205
	Tersan 1991	Du Pont	206
cadmium	Caddy	Cleary	207
	Cadtrete	Cleary	208
	Cadminate	Mallinckrodt	209
	Kromad	Mallinckrodt	210
chloroneb	Proturf Fung. II	Scotts	211
	Teremec SP	Gordon	212
	Terreneb SP	Kincaid	241
chlorothalonil	Daconil 2787	SDS Biotech	213
	Proturf 10IV	Scotts	214
cycloheximide	Acti-dione TGF	Nor-Am	215
ethazol	Koban	Mallinckrodt	216
	Terrazole	Olin	217
fenarimol	Rubigan	Elanco	218
iprodione	Chipco 26019	Rhone Poulenc	219
	Proturf Fung. 6	Scotts	220
mancozeb	Fore	Rohm and Haas	221
	Formec 80	Gordon	222
maneb	Tersan LSR	Du Pont	223
mercuries	Calo-Clor	Mallinckrodt	224
	Calo-Gran	Mallinckrodt	225
metalaxyl	Subdue	Ciba Geigy	226
	Ridomil	Ciba Geigy	241
	Apron	Gustafson	242
PCNB	Terraclor 75	Olin	227
PMA (PMAS)	PMA, PMAS	Cleary	228
PMA plus Thiram	Proturf Broad Spectrum Fung.	Scotts	229
propamocarb	Banol	Nor-Am	230
thiabendazole	Mertect	Merck	243
thiophanate	Cleary's 3336	Cleary	231
thiophanate methy	Fungo 50	Mallinckrodt	232
	Proturf Systemic	Scotts	233
thiram	Chipco Thiram 75	Rhone Poulenc	234
	Spotrete	Cleary	235
thiophanate plus thiram	Bromosan	Cleary	236
thiophanate-methyl plus maneb	Duosan	Mallinckrodt	237
triadimefon	Bayleton	Mobay	238
	Proturf Fung. 7	Scotts	239
vinclozolin	Vorlan	Malinckrodt	240

ryegrasses are not as susceptible as annual. Under severe disease pressure chemical control may be required.

Fairy rings

Fairy rings generally appear in lawns and other turf areas as circles or arcs of dark green, fast-growing grass during the spring and early summer. A ring of thin dead grass may develop on one or both sides of this circle.

The disease is caused by one of several soil-inhabiting fungi that commonly produce mushrooms. Mushrooms that sometimes appear in the ring are the fruiting bodies of these fungi. Stimulation of the grass is due to the release of nutrients from the organic breakdown of the thatch by the growing fungus.

It is difficult to control fairy ring. There are no chemicals labeled for the control of fairy ring. Two general approaches may be considered, removal and suppression. Although relatively impractical, removal of infected soil and grass to a depth of 12 inches or more in a band several feet on each side of the infected area and replacement with clean soil is one solution.

Another approach is to suppress the disease. For low maintenance grass areas, increase the water and fertilization program to stimulate the declining grass inside the ring. Symptoms of fairy ring can be masked by pumping large quantities of water into this area.

Slime molds

Slime molds are a group of organisms that cover above-ground plant parts with a dusty gray-black or dirty yellow mass. When you look closely at this growth, you see small round balls scattered over the plant. If you rub these between your fingers a sooty powder emerges. This consists of spores of the fungus.

Slime molds normally live in soil where they feed on decaying organic matter. When the mold is ready to reproduce, it grows up on to the grass blades so that the spores may be spread greater distances.

Slime molds do not feed on living plants. They only use them to assist in the distribution of spores during reproduction.

Slime molds occur during wet weather throughout the spring, summer and fall. They disappear rapidly as soon as it becomes dry. Chemical control is usually not necessary. **WT&T**

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Triplex-376 mower

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Reels are dynamically balanced to provide a beautiful fine cut.

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Circle No. 103 on Reader Inquiry Card

Perched on lava cliffs overlooking the Pacific Ocean sits the sprawling Kona Surf Resort Hotel in Hawaii. It's the determination of landscape supervisor Ray Berg that coaxes the lush landscape from the unyielding lava rock to produce one of the island's most beautiful landscapes.

"Lavascape" Landscaping

by **Maureen Hrehocik**, managing editor

Bougainvillea blooming *among the black lava rock and well-manicured pathways add to the Kona Surf's tropical beauty.*

Ray Berg has a big "clay pot" to grow his landscaping in—an 11-acre clay pot to be exact.

That's what the supervisor of the Kona Surf Resort Hotel in Kona, HI, likens having to coax plants to grow in almost solid lava rock. But, at the Kona Surf, Mother Nature hasn't left Berg with much of a choice.

He admits he likes the challenge—in fact he says he thrives on finding different or unique ways of doing things. Landscaping the Kona Surf has supplied Berg with an almost limitless "laboratory" in which to experiment.

"Lavascape"

Ray Cain of Belt Collins Associates designed the landscaping for the 550-room hotel which is perched on cliffs of lava rock on the Big Island of Hawaii.

Cain and Berg together chose the actual plant types.

"Our major problems in starting out with this project were salinity, the wind, labor and a place to get the plants we wanted," says Cain. Even erosion stakes were hard to keep in place because of the wind when construction first began.

Ray Berg *checks his containerized stock.*

Cain had 5,000 tons of soil brought in as a base to start more eye-pleasing vegetation growing in and among the black lava rock. There were so many weed seeds in the soil that one worker's job in the three months prior to the hotel's opening was to pull weeds. Plants were shipped in from Oahu. Anywhere the rock showed any crevices, dirt was added, a plant and then stones to keep the plant from snapping off in the wind. And then plenty of water.

Remarkably, most of the plantings took. Today, it looks as if the plants are growing (and thriving) right out of the rocks. The brilliant purple, pink and red bougainvillea and deep tropical greens against the black rocks create the kind of scenery the Hawaiian islands are famous for. For Berg, they create a low-maintenance landscape.

The backbone of landscaping in Hawaii is water.

"The backbone of landscaping in Hawaii is water," says Cain. "It's very precious and is a major consideration in any landscape design here.

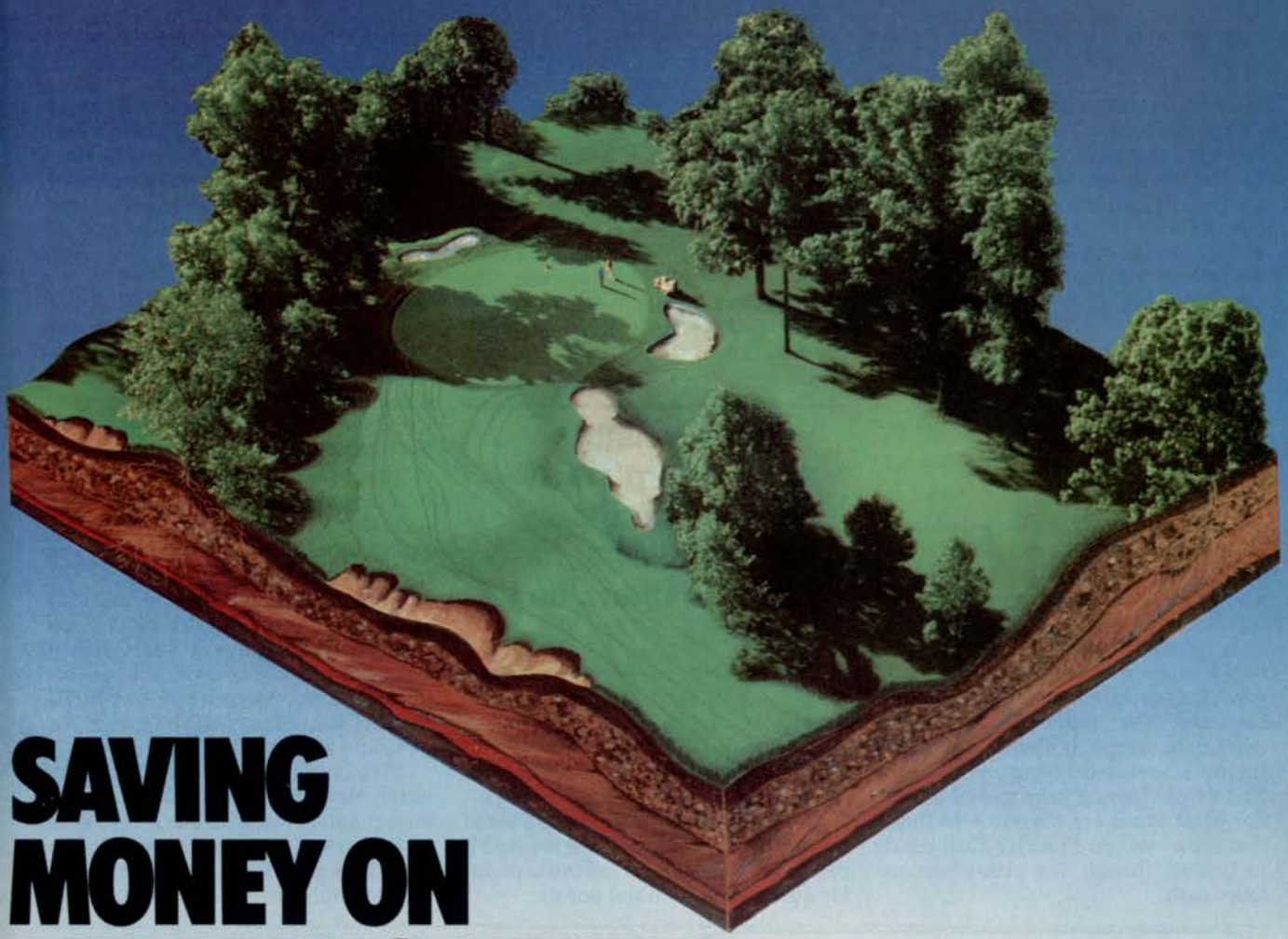
Salinity and wind are also problems that can't be solved; just worked around."

A particularly bad storm in January drove the ocean crashing in onto the cliffs on which the hotel is built with such force that the salt spray yellowed the palm fronds and the bermudagrass turf along the hotel's ocean walk.

"The elements are vicious here," says Berg, "but they're also forgiving. In a few weeks the grass will green-up again."

The normal 900 to 1,500 parts per million of sodium in the water can climb as high as 2,000 ppm.

"That's another reason why water



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Franklin Electric

Water for a Thirsty World

is so important to us," explains Berg. "We have to leach the salt out of the soil by watering."

The storm also washed out a pond on the hotel grounds that Berg had just completed.

"It does get discouraging when you work long and hard on a project and it gets destroyed in a matter of hours," Berg says.

But, almost as quickly as Mother Nature can destroy things, she can give them back.

"It's surprising how fast plants establish here."

Plant types

The different types of plants that grow on the grounds of the Kona Surf could fill a book. A sampling includes: sea grapes, philodenrons, kiave, African tulip trees, poinciana trees, macadamia nuts, puma, papaya, breadfruit, tamarind, rheodiscolor, impaciens, cat's claw, frangiapane, mango, bananas, coffee trees, silver buttonwoods, dresina marginata, ginger, ti plants, variegated hibiscus, portulaca, bougainvillea and 35 different types of palm trees. Many of the plant types are the same as those that grow well on Florida's Gulf coast. In Hawaii, though, the plants become more lush.

Berg has been with the hotel since it opened 14 years ago. He lives on the hotel property in a house on the ocean. It's his own backyard that provides ample opportunity to experiment and improve on different plants. Some of them, like wedelia, he integrates into the hotel landscaping; others he grows for his own enjoyment. He changed the wedelia in one part of the hotel three times to get it just the way he wanted it.

Whatever nature throws Berg's way, he's seemed to outsmart. What he can't outsmart, he replaces.

"You may not see it right away, but if you look hard enough you can see different ways of doing things," he says.

Where the original homesite stood on the hotel grounds, Berg created a patio area that's one of the more popular quiet spots for hotel guests.

Another reason Berg experiments at home is that he can't always find what he wants at local nurseries. Nurseries in Hawaii are limited and most of the time can't deal with the volume or types of plants Berg needs.

Maintenance schedule

Berg has a crew of 10 year-round and as many as 14 during the summer months. Two of his crew are scheduled to care for the hotel's interior plantings. Because the Kona Surf is in the process of being sold, Berg's budget hasn't been increased.

Hotel guests and a healthy supply of mongoose give the bermudagrass a good workout, as does the sun. It's still the storms, though, that wreak the most havoc with the turf.

Berg maintains a daily maintenance schedule. Fertilizing is done three or four times a year with a 16-16-16 mixture after the bougainvillea blooms. Macadamia nut shells provide an indestructible mulch for beds and under trees.

"We only use them away from the hotel, though, because they tend to attract ants," explains Berg.

Whatever nature throws Berg's way, he's seemed to outsmart. What he can't outsmart, he replaces. **WT&T**

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Circle No. 154 on Reader Inquiry Card

SPORTS TURF

by **Ron Hall**, assistant editor

Grass safer again

"It's almost as good as..."

Carol Ann Comly, an ambitious young athletic trainer, put that phrase to the test in a recent study of grass and artificial turf football fields and discovered that "almost" isn't good enough. Not when it comes to the safety of athletes anyway.

"Artificial turf contributes an additional risk of injury," Comly, now working as a therapist at the Coatesville Veteran's Hospital near Philadelphia, writes in a comprehensive comparison of football injuries in two Eastern universities, Temple and West Chester. Temple plays on an artificial surface, West Chester on grass. Since there were 148 members on each of the two teams, Comly feels her comparison is valid.

She used data reported from the 1982 season to the National Athletic Injury/Illness Recording Service (NAIRS) at Penn State University in her 47-page study. NAIRS is a computerized surveillance system designed to help school policy makers make meaningful sports safety decisions. Team trainers of member schools supply weekly injury reports to NAIRS during the season.

Her findings?

There were more injuries on the synthetic surface than on grass, 110-50. The number of minor injuries was greater by a 72-27 margin on the artificial field, "significant" injuries by a 38-23 gap.

Proponents of synthetic turf point to the intensive use their fields can support. They claim annual maintenance costs are lower, and artificial turf requires a less technically trained management team. These points are arguable.

Grass fields have the benefits of being less expensive to build and less expensive to repair. In the long run, a quality grass athletic field is more economical than an artificial surface because of the need to periodically replace worn synthetic surfaces. Turf is also measurably cooler during warm-weather sporting events.

Comly, who has coached and officiated grade school field hockey, and lacrosse, writes the controversy is "open to further investigation." Her open-minded approach is sensible. It might be that blanket condemnations of synthetic are short-sighted. Even in the turf industry. The use of synthetic grass can probably be justified in areas where the likelihood of establishing quality turf is questionable, perhaps even in conjunction with turf, such as along the sidelines of a turf football field.

The question of player safety, however, remains the first consideration.

The wonder is that field managers, particularly those with the grass-or-synthetic decisions, slide so easily to the debatable convenience of synthetic even in the face of studies like Ms. Comly's.

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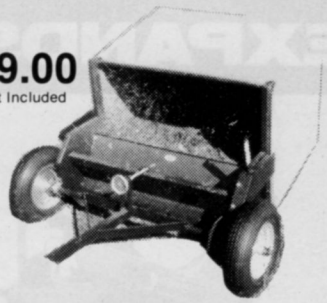

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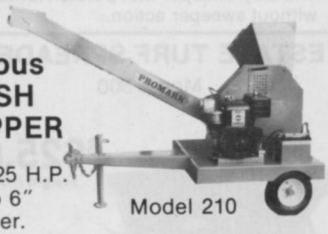

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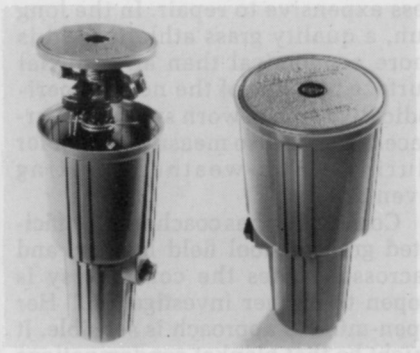
Circle No. 148 on Reader Inquiry Card

PRODUCTS

New Rain Bird pop-up sprinklers are tough

Rain Bird Sprinkler Manufacturing Corp. introduces a line of tough new pop-up sprinklers. The case and cover of the Mini-Paw series sprinklers are molded of Cycolac brand ABS engineering thermoplastic, grade GSM, supplied by Borg-Warner Chemicals, Inc.



Rain Bird chose Cycolac grade GSM because of its rigidity and toughness.

The sprinklers will operate in a full circle, or can be adjusted to part circle operation from 20 to 240 degrees of arc. A "Seal-a-matic" option helps prevent wasted water and soil erosion due to low sprinkler head drainage. The units operate at water pressures from 25 to 50 psi, and can be spaced from 27 to 49 feet for optimum operation, Rain Bird says.

Circle No. 191 on Reader Inquiry Card

Ranger is 21-inch commercial mower

Exmark Manufacturing is now marketing a 21-inch, self-propelled commercial mower. It features a compact rear-discharge design and is powered by a 4 hp Briggs & Stratton regular or I/C engine.

The mower, the Ranger, comes with variable speed control and differential action, adjustable cutting height from 1/2 to 3 1/2 inches, and an ultra-high lift, tempered steel blade. Exmark says the simplicity of the Ranger's design allows minor repairs to be performed in the field by operators.

Circle No. 192 on Reader Inquiry Card

American Trencher shows Bradco line

American Trencher Inc. announces an expanded line of Bradco attachment trenchers. These include 3-pt. hitch, skid steer, quick attach tractor, and solidly bolted on tractor models.

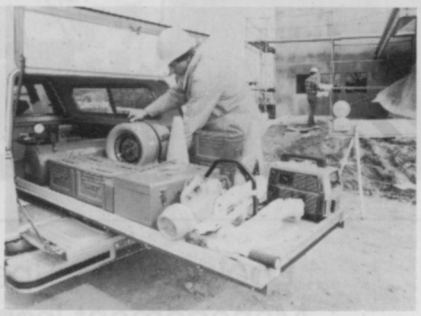
All models feature oil-bath-enclosed drives and seals to protect bearings. Several models also include dual pivot, paddle or ribbon augers, offset or center mounting, and chain guides. Options can be ordered to equip these trenchers for specific jobs.

Circle No. 193 on Reader Inquiry Card

Shelf for pick-up puts tools in reach

Hacke Enterprises manufactures a shelf that can be installed in the bed of a pick-up and rolls out making tools and parts more accessible.

The Continental Shelf comes in six and eight foot length models and fits any width pick-up bed. It comes in kit form with steel side rails, track, rollers, and hardware. It requires few tools to custom install.



Circle No. 194 on Reader Inquiry Card

Palm Desert Greens Country Club is positive proof.

Maintaining one of the heaviest played executive golf courses in Southern California is a challenging job. An average of 290 rounds of golf a day puts tough demands on the turf, and on the irrigation system. That's why golf course superintendent Robert Stuczynski recently installed Weather-matic rotary pop-up sprinklers to upgrade the system at the Palm Desert Greens Country Club.

Stuczynski was won away from a brand he'd used for more than a decade by Weather-matic's high quality design and adjustable features. The exclusive adjustable armspring allows fine-tuning while the sprinkler is on or off, and *stays* adjusted once set — a must for handling Palm Desert's exacting schedule of watering and fertilizing.

Weather-matic impact drive, rotary pop-up sprinkler heads are available in rugged cast aluminum alloy and high impact plastic for your long-range or medium-range needs — from golf courses, parks and athletic fields to commercial use.

Designed for years of dependable service, they offer many outstanding features. Like the optional check valve, available on PK models to prevent backflow in low areas and damaging line surge. And only Weather-matic can help reduce your inventory with interchangeable parts for plastic and metal heads.*

When you team up our rotary pop-up sprinklers, controllers and valves, you have a combination that can't be beat. Just ask Stuczynski. He's now finalizing a plan to changeover the entire Palm Desert system to Weather-matic. Because Weather-matic works. Write or call for all the details.

*Available in Spring 1985.

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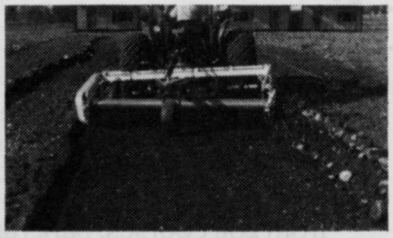

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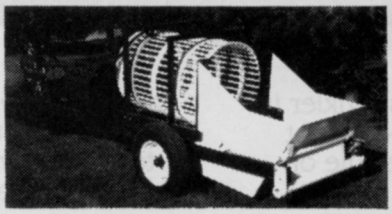

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New Gandy spreaders easy to disassemble

Gandy Company's new 24 and 42-inch spreaders completely disassemble without special tools. All parts are replaceable. Both spreaders feature stainless steel bottom and slides, with bottoms snapping off for quick and easy cleaning.

The Model 24, a push handle model, has a positive slide shutoff activated by a handle crank and holds

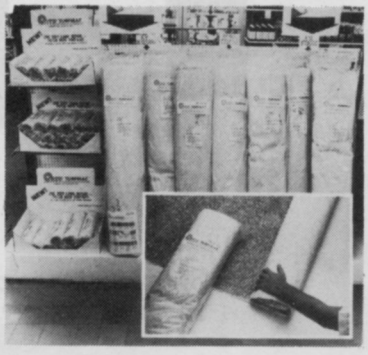
about 80 lb. of material. The 42-inch Model 42 may be ordered with a tractor hitch or push handle and has a spreading plate to give positive shutoff when brought up against the hopper bottom. The Model 42, with a 225-lb. capacity, has optional fixed-rate bottoms for overseeding and top dressing.

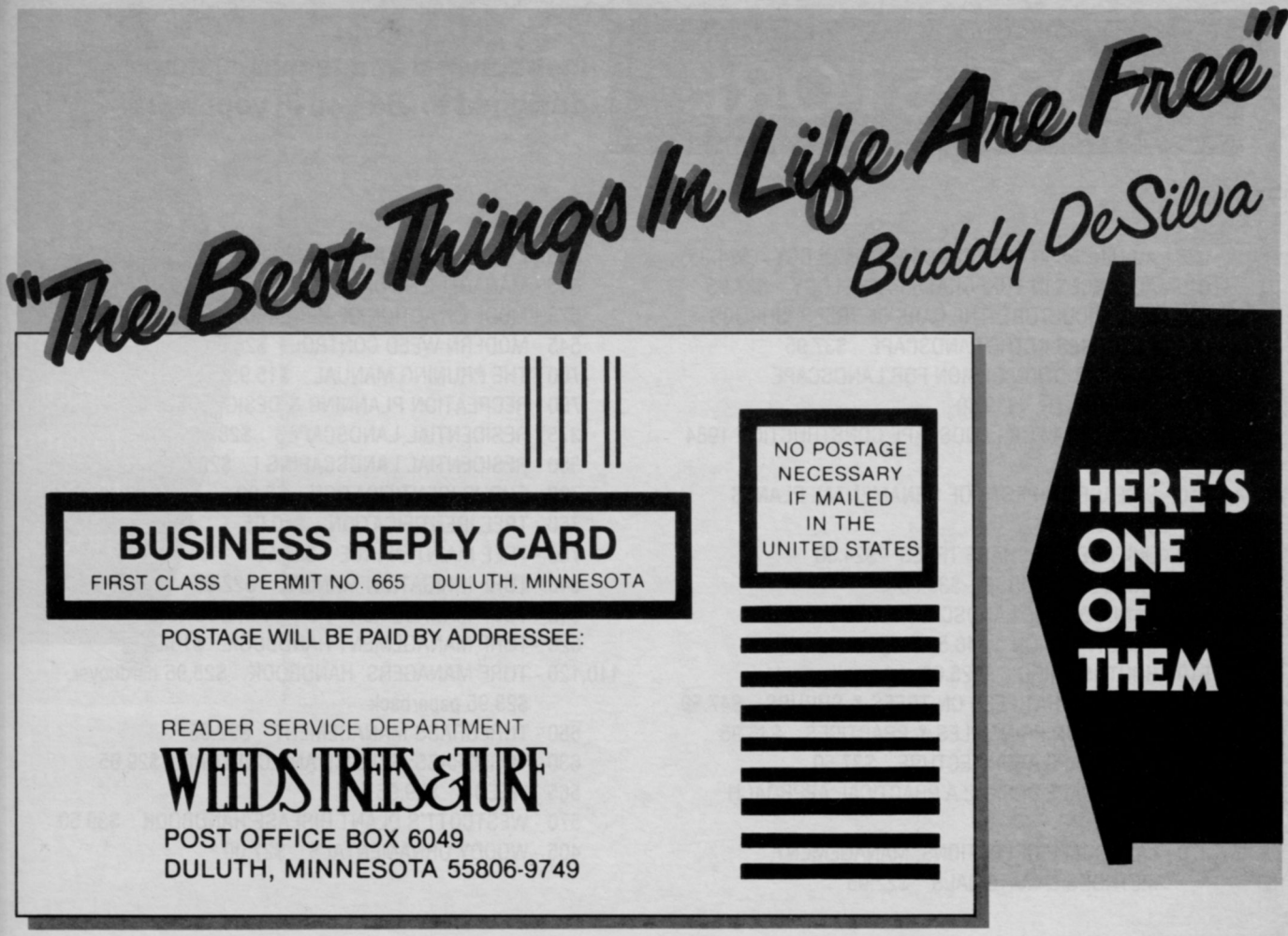
Circle No. 198 on Reader Inquiry Card

Turfmat offers seeding sodding alternative

Modern Turf Products, Inc., has introduced Turfmat, an alternative to sodding and seeding. Turfmat combines grass seed, starter fertilizer, and a fine straw mulch bonded with a water soluble adhesive.

Recommended for use in home lawns, commercial/industrial grounds, roadsides, cemeteries, and

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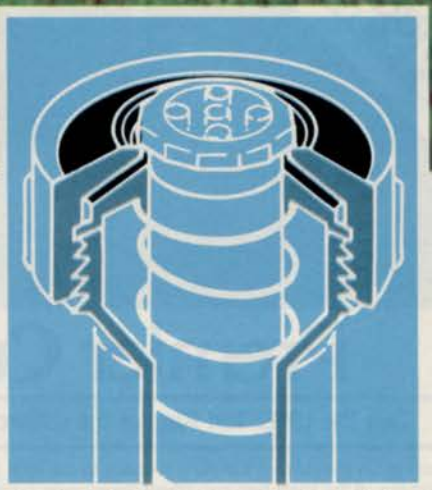
WTT/LCI

Now Toro's popular 570 Family gives you even greater flexibility

New 570-4P spray head clears taller grasses

With a full 4¼" pop-up to the nozzle, Toro's new 570-4P spray head effectively clears tall grass and low ground cover, making the 570 Family more versatile than ever. Now you have a full range of pop-up sprinklers: 2", 3", 4¼", 6" and 12", plus shrub risers. The new 570-4P has superior, positive retraction, with a stainless steel spring to make sure it pops down completely out of sight when not in use. And it's designed to handle all kinds of water sources, thanks to new, improved seal and minimal self-flushing action. An all-new body design includes Toro's exclusive "Conilip" seal and cap configuration. The screw-on cap makes it repairable from the top of the sprinkler. It accepts all 570 nozzles and filter screens, including Toro's full-range of nozzle angles: 0°, 10° and 35°. Now, more than ever, you'll find the answer is Toro!



Toro's exclusive Conilip seal and cap flush dirt and debris – assure positive retraction.

TORO®

EXCELLENCE IN IRRIGATION™

The Toro Company, Irrigation Division
Dept. WT-485, P.O. Box 489, Riverside, CA 92502

Circle No. 162 on Reader Inquiry Card

golf courses, Turfmat controls hillside erosion, can be used to patch dead grass areas, and grows in difficult environments such as dry or sandy soil.

It is available in convenient roll packaging, is easy to cut and shape, and is lightweight.

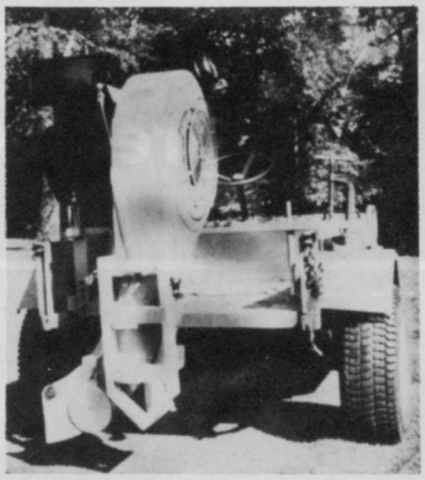
Circle No. 199 on Reader Inquiry Card

A big air broom from Atwater Strong

Atwater Strong introduces the Big Blast Model 16-BTW Low-Blo air broom two-way blower. It is designed to clean large areas of leaves and debris and it can be fitted to most work carts or two-wheeled, tow-behind trailers.

The Low-Blo's 16-hp cast-iron engine rotates an 18-inch, 8-bladed magnesium fan at 3600 rpm and develops 5000 cubic feet of air per minute at a blast velocity of 175 mph. It sweeps a 25-foot swath.

With a bed adjustment of 11 to 26 inches in height, the Low-Blo's exclusive two-way operation permits direction of the air blast.



Circle No. 200 on Reader Inquiry Card

Fertigation possible with new Chemigator

Performance Products, Inc., offers a simplified venturi injection unit that allows the application of fertilizers and chemicals directly through a lawn and garden or agricultural irrigation system. It is called the Chemigator.

As water passes through the Chemigator a vacuum develops and pulls the fertilizer out of the container into the main stream. The built-in bypass valve allows for adjustment of the liquid additive. A sight gauge shows how the adjustment is affecting the additive rate. The unit has no moving parts, and no electric power is needed.

Circle No. 201 on Reader Inquiry Card

PumpTec imports portable sprayer

The Arimitsu portable power sprayer, used for many years in Japan, is being introduced to the U.S. by PumpTec. The Arimitsu is available as a gas or electric unit and is capable of up to 300 PSI at 1 GPM.

The compact sprayer weighs only 11 lbs. and comes complete with eight feet of suction hose, 33 feet of discharge hose, and spray gun. It can be used to apply chemicals to plants, coatings to poly, or it can serve as a pressure washer for smaller cleaning tasks such as lawn maintenance equipment.

Circle No. 202 on Reader Inquiry Card

Premier Cut

Buy the 1985 Turf King at the rollback price!

Cash in on the current Turf King rollback to the 1981 price, while enjoying all the latest features: Power-driven reels; hydrostatic traction with foot-operated treadle to match mowing speeds to terrain; ±25° vertically articulated reels for a smooth, quality cut; a 14-hp, cast-iron engine; hinged hood for easy service access; and a cushioned seat and fixed sulky for a secure, comfortable ride.

Turf King . . . in 76-inch and 84-inch sizes. For a premier cut. Available only at your participating Jacobsen Distributor. Offer expires August 1, 1985.

Jacobsen Division of Textron Inc., 1721 Packard Avenue, Racine, Wisconsin 53403.

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J-135

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ADVANTAGE

FAST, EFFICIENT, LOW COST, LOW MAINTENANCE WAY TO TURFGRASS AERATION

Low energy aerifier

The **AER-WAY turf aerifier is** a low maintenance, low energy aerifier designed especially for hard compacted traffic and playing areas and sod establishment. It can be **used** for parks, sports fields, cemeteries, school grounds, estates, and **wherever appearances are important.**

There are several model sizes available to handle jobs large and small. The tines are available in either a 4½ or 6½ in. length.

The unique patented design fractures the soil between the tines enhancing the soil profile and its natural capillary action. This allows air moisture and fertilizer to get to the root system maximizing growth and greener turf.

The tufts of grass produced by the aeration disappear with the first cutting. The "AER-WAY" now comes standard with a full width weight box, tow bar and parking stands.

Contact your nearest HOLLAND office for the name of your nearest "AER-WAY" dealer.

NEW DEALER INQUIRIES ALSO WELCOME

*Ask about our optional no-tear-4" bentgrass rollers.

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Holland Hitch Western, Ltd., Cloverdale, B.C. V3S 5K1 Telephone (604) 574-7491
Holland Hitch of Texas, Inc., Wylie, Texas 75098 Telephone (214) 442-3556

Circle No. 122 on Reader Inquiry Card

New Bunton spreader cuts a wide swath

The new Bunton multi-purpose commercial spreader evenly distributes grass seed, fertilizer, or sand over a 16-foot wide path. The spreader features a 130 lb. capacity, stainless steel hopper and blower/spreader, and heavy gauge steel handles.

The quiet 2.3 hp, 4-cycle Robin engine moves the new Bunton spreader at speeds up to 2 mph, and finger-tip steering provides good manueverability.

Circle No. 203 on Reader Inquiry Card

Toro Irrigation's new sprinkler heads

Toro's XP-300 family of sprinkler heads was designed as a companion to Toro's Stream Rotor and features a low precipitation rate which causes water to be applied slowly. A matched precipitation rate offers the flexibility of valving part circle and full circle sprinklers together.

The XP-300 sprinklers' stainless steel retraction assures positive pop down of the head, and a wiper seal keeps dirt out. Large screens protect the nozzles from clogging. Toro says these sprinklers are designed for both residential and commercial use.

Circle No. 204 on Reader Inquiry Card

Coming Next Month

Landscape Manager's Guide IV

Insect Control

Slash labor costs with the DUCKBILL® Tree Anchoring System

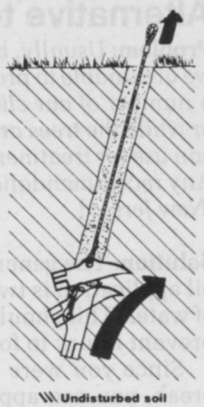
One man can anchor a tree with 3 Duckbills in minutes

Robert L. Swain, vice president of the Dawson Corporation, landscape contractors in Windsor, NJ, said, "We used your Duckbill Earth Anchors to hold a large number of trees in place after planting. This cut the labor time by such a drastic margin that we saved a week's time with a four man crew!"

Landscape architects nationwide are specifying Duckbills on more and more projects because Duckbills are the easiest and fastest, the strongest and the safest because there are no rigid rods or hard steel loops left above ground to injure people or pets or damage motorized equipment. Only a small pliable loop remains above ground.

Duckbills are used to anchor trees, sheds, fences, park benches, tables, many other things that can be stolen or blown away. There are four sizes, from 250 to 5,000 lbs. holding capacity, to meet all anchoring needs.

Duckbills are driven into the ground using a drive rod and heavy hammer till only the cable loop remains above ground. An upward pull on the cable rotates the Duckbill into a load lock position, like a toggle bolt in undisturbed earth. When anchoring is no longer needed, simply cut cables at ground level, leaving no sign anchors were used.



For complete details call or write today. Foresight Industries Inc., P.O. Box 4067, 1603 Capital Avenue, Suite 307, Cheyenne, WY 82003. Phone (307) 635-4163.

FORESIGHT™ INDUSTRIES INC.

Circle No. 115 on Reader Inquiry Card

PROBLEM SOLVERS

by Balakrishna Rao, Ph.D

pH in Florida turf

Problem: *What is your opinion on the importance of soil testing the pH value in turfgrass culture and management in Florida? (Florida)*

Solution: Soil testing is an important management tool in turfgrass culture. The pH of soil solution determines the solubility and, thus, the availability of nutrients for root absorption. Under excessively alkaline or acidic conditions, turfgrass may not respond properly to a fertilization program. Corrective procedures would depend upon the pH, soil texture and turfgrass species.

Reports from the University of Florida indicates that turfgrasses differ in their adaptability to soil acidity. For example, centipede and bahia will grow in a more acidic environment (pH of 5.0 - 6.0) that St. Augustine or zoysia, which grow best at a near neutral (pH of 6.0 - 7.0) soil reaction.

The following table should be helpful in understanding turfgrass species adaption to pH in your area.

Desirable pH Ranges for Lawn Grasses in Florida

pH 5.0-5.4	Carpet, Centipede, Bahia
pH 5.5-5.9	Carpet, Centipede, Bahia, Italian Rye
pH 6.0-6.4	Bermuda, Fescue, Italian Rye, St. Augustine, Zoysia
pH 6.5-6.9	Bermuda, Fescue, St. Augustine, Zoysia

Alternative to dormant oil

Problem: *Usually, because of the weather conditions, we are unable to provide a dormant oil application to a number of our clients' properties before bud break or while the trees are dormant. Is there something we can use for treatment after the foliage begins to flush? Any recommendations would be greatly appreciated. (New Jersey)*

Solution: The general recommendation for dormant oil application is two to three gallons per 100 gallons of water. This should be applied prior to bud break to prevent injury to foliage.

Since you were unable to apply this before bud break, you can apply a summer oil-malathion mix (two quarts of oil, plus 1.5 pints malathion per 100 gallons of water), any time from bud break and throughout the season. This will aid in preventing a build-up of sucking insects such as aphids, mites and scales.

CAUTION: Read the label and follow the directions! Reports indicate that plants like sugar maple, Japanese maple, beech, black walnut, hickory, nut trees (in general), red bud, and Colorado blue spruce are sensitive to oil. Dormant oil will remove the bluish waxy bloom from Colorado blue spruce needles when applied during the dormancy period. They will normally produce a new wax coat in four to six weeks. The 'Canart' juniper is sensitive to malathion in the summer oil treatment.

Injury is more likely to occur if the plants are under environmental stress such as drought. Therefore, be careful if you are considering a blanket treatment to all plants on a property.

Although summer oil can take care of a number of pests, foliar application of other insecticides may be necessary, as needed, during the insect activity period to manage the pest problem.

Bird dropping control

Problem: *Would you please recommend some chemical or other means of how we can keep the birds from feeding on our blueberries and cherries? Their feeding doesn't bother us, but their excrement creates a mess. We would appreciate your comments in this regard. (New York)*

Solution: Blueberries or even the small cherry plants can be protected from bird feeding by covering the plants with nylon nettings. This would be practical if you have only a few plants.

Mesurol 75% Wettable Powder insecticide is a bird repellant manufactured by Mobay Chemical Company and is registered for use on blueberries and cherries.

Read the label and follow the directions for the dosage guidelines. Apply Mesurol using conventional sprayers as a full coverage spray as cherries begin to ripen. Do not apply more than a total of three times per season to repel birds. Do not apply within seven days of harvest and do not graze animals in treated areas.

Balakrishna Rao is Director of Lawn Care Technical Resources for Davey Tree Expert Co., Kent, OH.

Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Please allow 2-3 months for an answer to appear in the magazine.

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HOFFCO is the only name you need to remember for a full line of trimmer/cutters and blowers!

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358 N.W. "F" St., Richmond, IN 47374 Telex 20212

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EVENTS

May

Arizona Turf, Landscape, and Irrigation Conference, May 2-4. Ramada Airport Resort, Phoenix, AZ. Contact Billie Reynolds, Arizona Landscape Contractors Association, P.O. Box 27312, Phoenix, AZ 85282. 602-968-8179.

Landscape Technology Certificate Program, May 8-9. Cal Poly, Pomona, CA. Drip irrigation, land design, and fertilization courses. Contact Wayne Smith, program director, Cal Poly, Office of Continuing Education, 3801 W. Temple Ave., Pomona, CA 91768. 714-598-4391.

Seminar and Procurement Trade Show, May 13-17. Venice, FL. Seminar for governmental purchasing personnel May 13-17, trade show May 14-15. Contact Jeanne B. Minnock, director of purchasing, The City of Venice, 401 W. Venice Ave., Venice, FL 33595. 813-485-3311.

Menninger Flowering Tree Conference, May 16-17. Cypress Gardens Quality Inn, Winter Haven, Fl. Contact Ellen M. Landry, Florida Nurserymen and Growers Association, 5401 Kirkman Road, Suite 650, Orlando, FL 32819. 305-345-8137.

JUNE

Univ. of Massachusetts Turf Field Day, June 26. Massachusetts Turfgrass Research Station, South Deerfield, MA. Contact Dr. Joseph Troll, Plant & Soil Sciences, Stockbridge Hall, Room 10, U. of Mass., Amherst, MA 01003. 413-545-2353.

International Turfgrass Society Conference, June 30-July 4. Avignon, France. Contact ITS, Agronomy Department, Virginia Polytechnic Institute, Blacksburg, VA 24061.

JULY

Association of Physical Plant Administrators of Universities and Colleges annual meeting, July 10-13. San Diego, CA. Contact Wayne Leroy, APPA, 1446 Duke St., Alexandria, VA, 22314. 703-684-1446.

To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 7500 Old Oak Boulevard, Cleveland, OH 44130.

STOP GRUBS FROM THE FIRST BITE TO THE LAST GASP.

Grubs are a hardy breed. They're tough to prevent and even tougher to get rid of once they start chowing down on the roots of your turf.

One thing that puts them off their feed is ®OFTANOL 5% Granular insecticide.

Another is new OFTANOL 2 Insecticide. It's a liquid formulation of OFTANOL, containing two pounds of active ingredient per gallon.

The nifty thing about OFTANOL, liquid or granular, is that it stops grub damage fast, even before it kills. After an application of OFTANOL, grubs stop feeding and the damage stops. Use it as a preventive, in the spring, or as a curative anytime grubs are a problem.

Grubs, one serious problem with two serious solutions. OFTANOL. Always read the label before use.

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WHEN YOU'RE SERIOUS
ABOUT GRUBS.**

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CLASSIFIEDS

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BOX NUMBER REPLIES: Mment, 120 W. 2nd St., Duluth, MN 55802. Please include box number in address.

BUSINESS OPPORTUNITIES

WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15485 N. East Street, Lansing, Michigan 48906. Phone (517) 484-7726. TF

SOD FARM FOR SALE serving the booming Las Vegas area. Owner ready to retire. For futher details write Nevada Turf Growers, Inc., 4295 S. Arville, Las Vegas 89103 4/85

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An opportunity of a life-time for the right person with a background in the Industry, to own a well established Landscape Construction, Lawn Maintenance and Nursery Business, located in a rapidly growing commercial/industrial Northwest Chicago Suburban area, consisting of the following: 6 acres of land, including 4 acres of 1,000 prime specimen trees, calipered at 2" - 5" min., modern large office, 5 bay fully equipped garage and service shop, storage buildings, and a leased income building. All large, and small equipment necessary to operate this type of business, also truck mounted snow removal equipment, a ¼ acre pond and paved road and lot, 2000 gal. diesel and gas tanks. A long list of prestigious clients with income of $800,000.00 to $1,500,000.00 annually. Over 25 years as an established business in the Industry. Huge growth potential. Terms available at low interest rates. Owner to stay on to help the right person establish themselves. This opportunity only comes along once in a life-time, take advantage of this offer. For more details, please direct all inquiries to: W.H.N., 23612 N. Hwy. 21, Mundelein, IL 60060. 5/85

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LAWN SEED. Wholesale. Full line of top quality grasses. Improved bluegrass varieties, fine fescues and fine bladed ryegrasses. We specialize in custom mixing. Oliger Seed Company, 2705 Wingate Avenue, Akron, OH 44314. Call collect (216) 753-2259. TF

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Used equipment for sale: 2 Jacobsen F-10 mowers ($5,000 & $7,000). 1 Roseman 7-gang mower, tow type, hydraulic powered with new motors ($5,000). 1 Jacobsen 5-gang ram lift ranger with fairway units ($2,000). 1 Roseman 5-gang ($1,000). 2 six-foot Lawn Genies ($1,000 each). 2 seven-foot Beck sweepers ($2,500 each). 1 five-foot Rogers sweeper ($500). 2 Jacobsen fairway mowing units ($400 each) plus spare parts. If interested call: (205) 821-0969. Beck's Turf-Nursery, P.O. Box 752, Auburn, AL 36830. 4/85

BALL BARRIER NETTING: Made of olefin fibers. 6 1/2 feet and 25 feet high. Strong and tough. Will not rust. Easy to handle. For Driving Ranges and Golf Courses. Keep golf balls from straying off-course. J.A. Cissel Mfg., Co., P.O. Box 339, Farmingdale, N.J. 07727. (800) 631-2234. 5/85

BUCKET TRUCKS, straight stick, corner mount and knuckle boom cranes. Sprayers, chippers, dumps, stakes, log loaders, crew cab chip box dumps, railroad trucks. 50 in stock. Sold as is or reconditioned. Opdyke's, Hatfield (Philadelphia area). 215-721-4444. TF

HYDRO-MULCHERS AND STRAW BLOWERS New and used. **JAMES LINCOLN CORPORATION,** 3220 S. Jupiter Rd., Garland, TX 75041. (214) 840-2440(TX), (800) 527-2304 (except TX) TF

1973 F-10 JACOBSEN FAIRWAY MOWER—6 Blade Reels, Ready to Mow, $11,500.00. C.O.D. Bowling Green Country Club, P.O. Box 958, Beech Bend Rd., Bowling Green, KY 42101. 4/85

Jacobsen HF-5—Hydraulic 5 gang with 6 blade reels front and rear rollers, wheel wts. and ROPS with canopy. 285 hrs. like new. Call (616) 887-7301, 7:00 AM to 5:00 PM—John Read. 4/85

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Tree and shrub specialist Chemlawn Services Corporation. Are you an ambitious person who is willing to take risks in a company growing at a 25% yearly rate, a company who has promoted 150 managers last year, a company which is the recognized leader in its industry? If so, you may qualify for an opportunity to join the Schaumburg, Illinois branch. Responsibilities will include sales and servicing our customers. This outstanding ground floor opportunity offers a salary, fringe benefits, continual job training and unlimited challenge. To find out more about this career opportunity, please write or call **Chemlawn Services Corporation, 1103 W. Morse Ave., Schaumburg, IL 60193, 312-529-4200.** 4/85

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Wanted to buy **HYDRO SEEDER**. Please send photo. Johnson Hydro Seeding Corp., 13751 Travilah Road, Rockville, MD 20850, 301/340-0805. TF

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LETTERS

More on sludge

In the article on sludge, (WT&T, Feb. 1985), it is interesting to notice that the original work for the Milwaukee Sewerage Commission by Dr. Knorr seems to have been completely overlooked!

Our company had the contract to remove sewage sludge for the City of Tampa. We did a lot of experimental work in the handling and use of "Sunset Sludge." Its primary use was as a topdressing for lawns. After two or three dressings, we found we were not having the usual calls for chinch bug sprays.

Calls to the University of Florida turf people referred us to the original research of Dr. Knorr. It seems the level of sulphur is quite high in sludge as it is taken up by grasses. This imparts a bitter taste which bugs don't like.

We had a pasture on which we conducted experiments to prove this.

Using several increasing amounts of sludge and nitrogen sources, the grass was allowed to grow. We then let the cattle and horses in.

Grass with the nitrogen application was eaten first, then minimum of sludge, reluctantly the increased amounts of treated grass were eaten. But as soon as the nitrogen-treated grass regenerated, they began eating it again. This was readily visible for several years. The horses used this area for a toilet and refused to eat. We had to mow and clean up the area that had the higher doses of sludge!

No one seems interested in what we found out in the original research. For some reason they prefer to walk the same (old) trail. We had many experiences with sludge in the years we sold and used it.

Robert L. Perry
Sunset Nursery Inc., Tampa, FL

APRIL 26, 1985

AD INDEX

NO.	ADVERTISER	PAGE
132	Agricultural Products/3M	71
	Briggs & Stratton Corp.	46-47
103	Brouwer Turf Equip., LTD.	81
102	Buckner Sprinklers	103
108	Country Mfg., Inc.	85
104	Cushman	10-11
107	Cushman	22-23
274	Ciba-Geigy Corp.	43
245	Ciba-Geigy Corp.	58-59
109	Dow Chemical U.S.A.	Cv2,-p.1
110	Dedoes Industries, Inc.	18
111	Dupont Co.—Typar	37
112	Elanco Products Co.	69
113	Excel Industries, Inc.	17
114	E-Z-Go	97
115	Foresight Industries	95
116	Franklin Electric Co.	83
117	Goossen Industries	78
118	Glenmac, Inc.	118
119	Hahn, Inc.	15
120	Hannay Reels	101
121	Hoffco, Inc.	98
122	Holland Equipment LTD.	94
123	Howard Price Turf Equip.	27
253	Irri-Trols Mfg., Inc.	75
125	Jacobsen/Textron	94
126	Jacklin Seed Co.	19
127	Kubota Tractor Corp.	33
233	Kut-Kwick Corp.	55
129	Lesco, Inc.	21
256	Lofts Seed Co.	Cv4
131	Lofts Seed Co.	Cv4
133	Milwaukee Sewerage District	56
235	Micro-Trak Systems, Inc.	9
135	Mobay-Oftanol	99
136	Mobay-Bayleton	72-73
137	Mobay-Dyrene	2
	Mobay-Nemacur (Regional)	67
139	Mobay-Oftanol	52-53
140	Monsanto Co.	6-7
	Monsanto Co. (Regional)	28
142	Mud Cat	84
163	Nepera, Inc.	60
143	Northrup King	57
144	Nor-Am Chemical Co.	Cv3
145	Nor-Am Chemical Co.	49
146	Olathe Mfg., Inc.	85
147	PBI Gordon Corp.	40-41
148	Promark Products	86
164	Salsco, Inc.	101
149	Stauffer Chemical Co.	79
150	Rain Bird Sprinkler Mfg.	61
151	Rhone-Poulenc, Inc.	34-35
152	Rhone-Poulenc, Inc.	51
153	SDS Biotech	64-65
154	Tennant Co.	84
158	Tee-2-Green Corp.	77
159	Toro Co.	5
155	Toro Irrg.	45
162	Toro Irrg.	93
156	Tuco-Agri. Chemicals	25
157	Turf Seed, Inc.	39
160	Weather-Matic	87
161	Wells Cargo, Inc.	88

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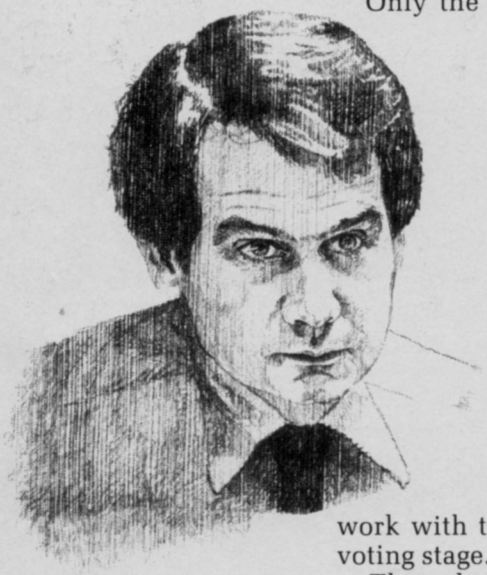
Circle No. 102 on Reader Inquiry Card

Safer than table salt doesn't work anymore

It's true. Many of our pesticides are less toxic than table salt. But, like the DDT cocktail swallowed by scientists in safety demonstrations across the country, these declarations of safety aren't enough to counteract the intense pressure being placed upon pesticide users today.



Only the user really determines the fate of a pesticide. The safest, most effective chemical can be struck down by the anti-pesticide lobby when major misuse is uncovered and broadcast to a distrustful nation.

We can beat our heads bloody fighting each government agency, one at a time, proving to each that pesticides are a worthwhile risk considering the benefit.

The BIG GOAL should be to regain the trust of our customers and the public in general. This will take a major effort by both manufacturers and users, an effort equal to or greater than the legal defense of pesticides in federal, state and local courts.

We need an offense as well as a defense. We should be extremely responsive to customer concerns. We should work with those proposing legislation in the areas of prenotification, licensing, and waste disposal. We can be a step ahead of anti-pesticiders rather than spending all our efforts fighting each skirmish they create.

The industry can't merely declare itself innocent and sue everyone who says otherwise. It has to recognize public concerns and work with the public to reach compromises BEFORE legislation reaches the voting stage.

The only way this can happen is a massive, unified effort between users and manufacturers to establish listening posts in every city and suburb in the U.S. This can only work if we act as a group and not as factions. Associations should join together to represent all users, not just their own. And, users should not assume association staffs can do all the work.

The structure for this listening post system has already been established. If you combined the listening system of the Professional Lawn Care Association of America and the government expertise of the American Association of Nurserymen and the National Arborist Association, you have a foundation for a major project to restore public trust.

Assuming users and manufacturers dedicate themselves to such an effort, success will still depend upon a responsive, concerned posture rather than a totally defensive one.

Safer than table salt just doesn't work anymore.

Bruce F. Shank

by Bruce F. Shank, executive editor

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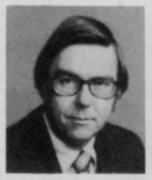

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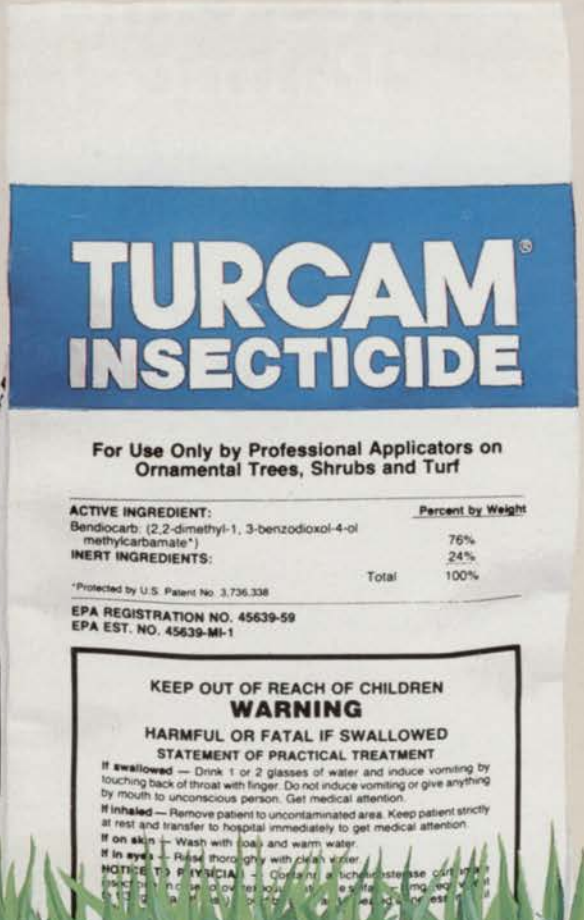
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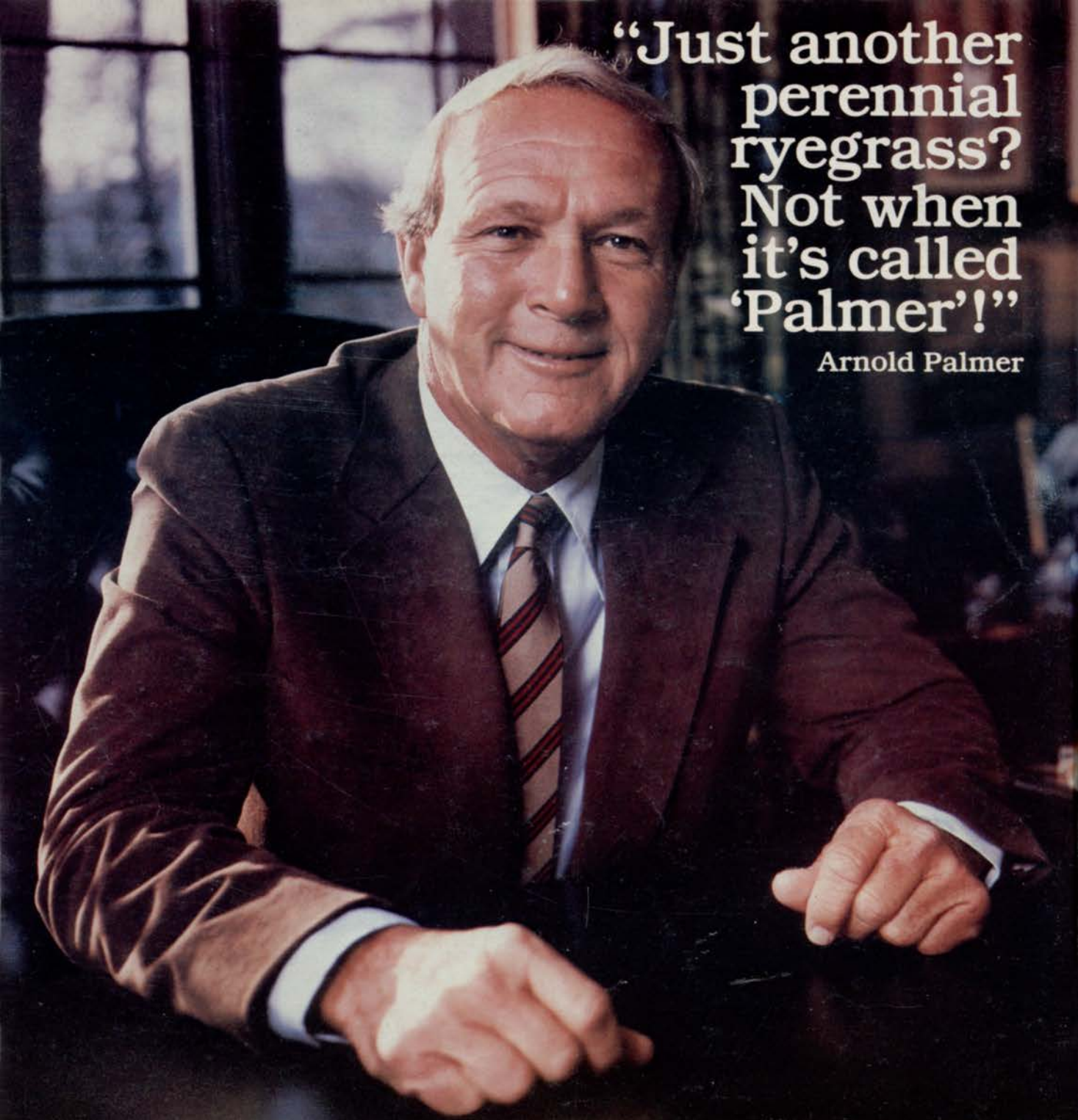

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